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(71)Applicant : FUJI XEROX CO LTD

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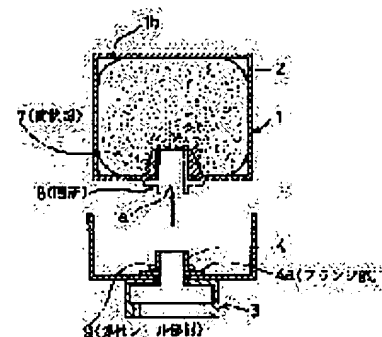
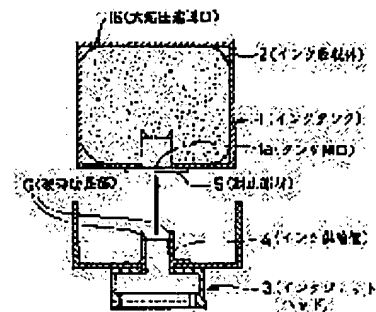
(72)Inventor : TAKAGI ATSUSHI  
OGAWA KATSUHIDE  
TOMIKAWA ICHIRO  
ISHISE TATSUHIRO

(54) INK JET CARTRIDGE, AND INK TANK AND INK JET HEAD WHICH ARE USED THEREFOR

(57)Abstract:

PURPOSE: To prevent ink effectively from sticking to an outer peripheral part of an ink tank when the ink tank is detached by a method wherein an replacement workability of the ink tank is improved and generation of bubbles following taking out and putting in of the ink tank is enabled to be restrained.

CONSTITUTION: An ink cartridge is as follows; a tank opening 1a of an ink tank is sealed with a seal member 5 capable of being crushed, which is composed of a non-like permeable material; besides, a crushing promotion part 6 which crushes the seal member 5 when an ink supply pipe 4 is brought into contact with the seal member 5 in providing the ink tank 1, is formed to the ink supply pipe 4 of an ink jet head 3; or, a cylindrical part 7 which protrudes inside and compresses an ink absorbing material 2, is provided to an inner peripheral fringe of the tank opening part 1a; or a recess 8 which contains an elastic seal member 9 existing between the other peripheral fringe of the tank opening 1a of the ink tank 1 and a flange part 4a of the ink supply pipe 4 is provided to the outer peripheral fringe of the tank opening of the ink tank 1.



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(71)出願人 000005496

富士ゼロックス株式会社

東京都港区赤坂三丁目3番5号

(72)発明者 高木 淳

神奈川県海老名市本郷2274番地 富士ゼロ

ックス株式会社海老名事業所内

(72)発明者 小川 克秀

神奈川県海老名市本郷2274番地 富士ゼロ

ックス株式会社海老名事業所内

(72)発明者 富川 伊知朗

神奈川県海老名市本郷2274番地 富士ゼロ

ックス株式会社海老名事業所内

(74)代理人 弁理士 小泉 雅裕 (外2名)

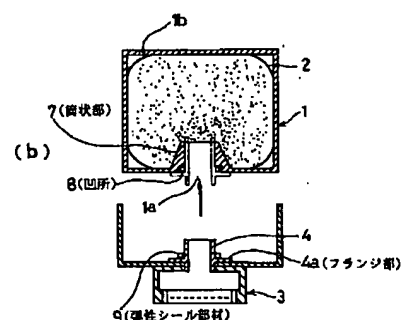
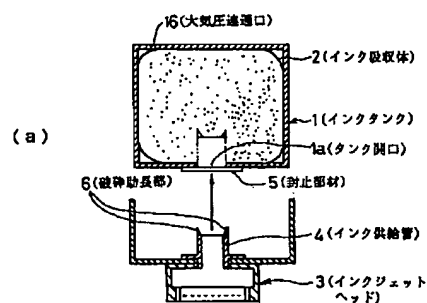
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(54)【発明の名称】 インクジェットカートリッジ並びにこれに用いられるインクタンク及びインクジェットヘッド

(57)【要約】

【目的】 インクタンクの交換作業性を向上させ、また、インクタンクの抜き差しに伴う気泡の発生を抑制でき、更に、インクタンク取り外し時のインクタンク外周部のインク付着を有効に防止するようにする。

【構成】 非インク浸透性材料からなる破砕可能な封止部材5にてインクタンク1のタンク開口1aを封止し、一方、インクジェットヘッド3のインク供給管4には、インクタンク1装着時にてインク供給管4がタンク開口1aの封止部材5に圧接した際に封止部材5が破砕される破砕助長部6を形成したり、あるいは、タンク開口1aの内周縁に内方に突出してインク吸収体2が圧縮される筒状部7を設けたり、あるいは、インクタンク1のタンク開口1aの外周縁にはインク供給管4のフランジ部4aとの間に介在する弾性シール部材9が収容される凹所8を設けたインクジェットカートリッジである。



【特許請求の範囲】

【請求項1】 インク（I）を含浸してなるインク吸収体（2）が内蔵され、インク供給用のタンク開口（1 a）及び大気圧連通口（1 b）が開設されているインクタンク（1）と、このインクタンク（1）が着脱自在に装着され、インクタンク（1）装着時にタンク開口（1 a）に挿入連結されてインク吸収体（2）に圧接配置されるインク供給管（4）を有し、このインク供給管

（4）を介して供給されるインクタンク（1）からのインク（I）を画像情報に応じて吐出するインクジェットヘッド（3）とを備えたインクジェットカートリッジであって、非インク浸透性材料からなる破砕可能な封止部材（5）にてインクタンク（1）のタンク開口（1 a）を封止し、一方、インクジェットヘッド（3）のインク供給管（4）には、インクタンク（1）装着時にインク供給管（4）がタンク開口（1 a）の封止部材（5）に圧接した際に封止部材（5）が破砕される破砕助長部（6）を形成したことを特徴とするインクジェットカートリッジ。

【請求項2】 請求項1記載のものにおいて、封止部材（5）は熱融着性フィルムにて構成されていることを特徴とするインクジェットカートリッジ。

【請求項3】 請求項1記載のものにおいて、破砕助長部（6）はインク供給管（4）の先端に形成された一若しくは複数の鋭利な突起を備えていることを特徴とするインクジェットカートリッジ。

【請求項4】 請求項1記載のものにおいて、破砕助長部（6）はインク供給管（4）の外周部に形成された複数本のリブを備えていることを特徴とするインクジェットカートリッジ。

【請求項5】 請求項1記載のものにおいて、インク供給管（4）の入り口部分に塵埃除去用フィルタを設けたことを特徴とするインクジェットカートリッジ。

【請求項6】 インク（I）を含浸してなるインク吸収体（2）が内蔵され、インク供給用のタンク開口（1 a）及び大気圧連通口（1 b）が開設されているインクタンク（1）と、このインクタンク（1）が着脱自在に装着され、インクタンク（1）装着時にタンク開口（1 a）に挿入連結されてインク吸収体（2）に圧接配置されるインク供給管（4）を有し、このインク供給管

（4）を介して供給されるインクタンク（1）からのインク（I）を画像情報に応じて吐出するインクジェットヘッド（3）とを備えたインクジェットカートリッジであって、タンク開口（1 a）の内周縁に内方に突出してインク吸収体（2）が圧縮される筒状部（7）を設けたことを特徴とするインクジェットカートリッジ。

【請求項7】 インク（I）を含浸してなるインク吸収体（2）が内蔵され、インク供給用のタンク開口（1 a）及び大気圧連通口（1 b）が開設されているインクタンク（1）と、このインクタンク（1）が着脱自在に

装着され、インクタンク（1）装着時にタンク開口（1 a）に挿入連結されてインク吸収体（2）に圧接配置されるインク供給管（4）を有し、このインク供給管

（4）を介して供給されるインクタンク（1）からのインク（I）を画像情報に応じて吐出するインクジェットヘッド（3）とを備えたインクジェットカートリッジであって、インクタンク（1）のタンク開口（1 a）の外周縁にはインク供給管（4）のフランジ部（4 a）との間に介在する弾性シール部材（9）が収容される凹所（8）を設けたことを特徴とするインクジェットカートリッジ。

【請求項8】 インク（I）を含浸してなるインク吸収体（2）が内蔵され、インク供給用のタンク開口（1 a）及び大気圧連通口（1 b）が開設されると共に、インクジェットヘッド（3）側のインク供給管（4）がタンク開口（1 a）に挿入連結されてインク吸収体（2）に圧接配置されるインクタンクであって、非インク浸透性材料からなる破砕可能な封止部材（5）にてタンク開口（1 a）を封止したことを特徴とするインクタンク。

【請求項9】 インク（I）を含浸してなるインク吸収体（2）が内蔵され、インク供給用のタンク開口（1 a）及び大気圧連通口（1 b）が開設されると共に、インクジェットヘッド（3）側のインク供給管（4）がタンク開口（1 a）に挿入連結されてインク吸収体（2）に圧接配置されるインクタンクであって、タンク開口（1 a）の内周縁に内方に突出してインク吸収体（2）が圧縮される筒状部（7）を設けたことを特徴とするインクタンク。

【請求項10】 インク（I）を含浸してなるインク吸収体（2）が内蔵され、インク供給用のタンク開口（1 a）及び大気圧連通口（1 b）が開設されると共に、インクジェットヘッド（3）側のインク供給管（4）がタンク開口（1 a）に挿入連結されてインク吸収体（2）に圧接配置されるインクタンクであって、タンク開口（1 a）の外周縁には、インク供給管（4）のフランジ部（4 a）との間に介在する弾性シール部材（9）が収容される凹所（8）を設けたことを特徴とするインクタンク。

【請求項11】 インク（I）を含浸してなるインク吸収体（2）が内蔵され、インク供給用のタンク開口（1 a）及び大気圧連通口（1 b）が開設されると共に、タンク開口（1 a）が非インク浸透性材料からなる破砕可能な封止部材（5）にて封止されたインクタンク（1）を着脱自在に装着するものであり、インクタンク（1）装着時にタンク開口（1 a）に挿入連結されてインク吸収体（2）に圧接配置されるインク供給管（4）を有し、このインク供給管（4）を介して供給されるインクタンク（1）からのインク（I）を画像情報に応じて吐出するインクジェットヘッドであって、インク供給管（4）には、インクタンク（1）装着時にインク供給

管（４）がタンク開口（１ａ）の封止部材（５）に圧接した際に封止部材（５）が破碎される破碎助長部（６）を形成したことを特徴とするインクジェットヘッド。

【発明の詳細な説明】

【０００１】

【産業上の利用分野】この発明は、インクジェット記録装置に係り、特に、インクジェット記録装置本体に着脱自在に装着されるインクジェットカートリッジ並びにこれに用いられるインクタンク及びインクジェットヘッドに関する。

【０００２】

【従来の技術】従来におけるインクジェット記録装置にあっては、インクの供給性を向上させるという観点から、インクタンクが交換可能に取り付けられるインクジェットヘッドからなるインクジェットカートリッジをインクジェット記録装置本体に対し着脱自在に装着するようにしたものが既に提供されている。

【０００３】従来この種のインクジェットカートリッジとしては、例えばインクジェットヘッド側に針状の供給管を設ける一方、インクタンク側のタンク開口部には弾性シール部材を介装し、この弾性シール部材に前記針状供給管を突き刺してインクタンクとインクジェットヘッドとを供給管を介して連通接続するようにしたものが提供されている（特開平３－８７２６６号公報参照）。しかしながら、このタイプにあっては、インクタンク交換時にインクジェットヘッド側の針状供給管が露呈した状態にあるので、当該針状供給管が作業者の手に触れる虞れがあり、作業安全上好ましいものではなかった。

【０００４】このような技術的課題を解決する手段として、例えばインクジェットヘッド側に筒状のインク供給管を突出する一方、インクタンク内にはインクが含浸しているインク吸収体を内蔵させ、タンク開口にインクジェットヘッド側のインク供給管を挿入連結させ、インク供給管をインク吸収体に圧接配置するようにしたものが既に提供されている（特開平２－１８７３６４号公報参照）。

【０００５】

【発明が解決しようとする課題】しかしながら、このタイプにあっては、未使用時のインクタンクのタンク開口を通常テープ若しくは蓋で封止することが必要であることから、インクタンク交換時には、テープ若しくは蓋を剥し、インクタンクのタンク開口を開放した後、当該インクタンクをインクジェットヘッド側に接続しなければならなかった。従って、このタイプにあっては、テープ若しくは蓋を剥すという手間が発生する分、インクタンクの交換作業が面倒になってしまうばかりか、テープ若しくは蓋を剥す際に、その振動等によってインクタンク内のインクが飛翔し作業者の手を汚すという第一の技術的課題が見い出された。

【０００６】また、上述したタイプにあっては、例えば

インクタンクの装着状態を再度確認するような場合等、インクタンク内部のインク吸収体がまだ十分にインクを含浸している状態のまま、インクタンクを抜き差ししてしまうと、インク供給管の挿入離脱動作に伴ってインク吸収体が伸縮するため、インクジェットヘッドへのインク供給管内部に大量の気泡が混入し、インクジェットヘッドのインク吐出動作を損なう懸念が生ずるという第二の技術的課題が見い出された。

【０００７】更に、上述したタイプにあっては、インクタンクのタンク開口周囲のシール性を保つために、通常インクタンクのタンク開口外周部底面にパッキン材を圧接する構造を採用しているが、インクタンクの装着状態を再度確認する場合やインクタンク交換時においてインクタンクを外すと、外したインクタンクのタンク開口外周部にインクが付着してしまい、当該付着インクが作業者の手に触れたり、周囲環境を汚すという第三の技術的課題が見い出された。

【０００８】この発明は、以上の技術的課題を解決するためになされたものであって、インクタンクの交換作業性を向上させ、また、インクタンクの抜き差しに伴う気泡の発生を抑制でき、更に、インクタンク取り外し時のインクタンク外周部のインク付着を有効に防止するようにしたインクジェットカートリッジ並びにこれに用いられるインクタンク及びインクジェットヘッドを提供するものである。

【０００９】すなわち、第一の技術的課題（インクタンクの交換作業性低下）を解決する第一の発明は、図１ａに示すように、インクＩを含浸してなるインク吸収体２が内蔵され、インク供給用のタンク開口１ａ及び大気圧連通口１ｂが開設されているインクタンク１と、このインクタンク１が着脱自在に装着され、インクタンク１装着時にタンク開口１ａに挿入連結されてインク吸収体２に圧接配置されるインク供給管４を有し、このインク供給管４を介して供給されるインクタンク１からのインクＩを画像情報に応じて吐出するインクジェットヘッド３とを備えたインクジェットカートリッジであって、非インク浸透性材料からなる破碎可能な封止部材５にてインクタンク１のタンク開口１ａを封止し、一方、インクジェットヘッド３のインク供給管４には、インクタンク１装着時にインク供給管４がタンク開口１ａの封止部材５に圧接した際に封止部材５が破碎される破碎助長部６を形成したことを特徴とするものである。

【００１０】このような技術的手段において、上記封止部材５としては、非インク浸透性の素材でタンク開口１ａを封止し、かつ、破碎助長部６にて破碎されるものであれば適宜選定して差し支えなく、例えば厚さ２０～２００μｍ程度のフィルムを貼るようにすればよい。このとき、上記フィルムとしては、例えばアルミ箔とポリエチレン、若しくは、ポリエステルとポリエチレンを主体にした多層構造ラミネート材料が使用することができ

る。尚、この材料はインクタンク1に直接熱融着による接着も可能である。

【0011】また、上記破砕助長部6としては、タンク開口1aが封止される封止部材5をインク供給管4で突き破ることを助長するものであれば適宜設計変更して差し支えない。例えば、インク供給管4の先端に鋭利な突起を一若しくは複数配置するようにすればよい。このとき、突起部の数を多く設定し過ぎると、封止部材5の破断部がインク供給管4の開口部を塞ぐ懸念があるため、突起部の数、配置等を適宜選定することが必要である。また、封止部材5の破砕効果を良好に保つには、インク供給管4の外周部に上記突起部を配置し、突起部の高さを1～3mm程度に設定することが好ましい。また、突起部の強度は封止部材5を突き破る際に折れたり、曲がったりすることがないように強靱な材料で形成することが必要である。

【0012】また、上記破砕助長部6として、封止部材5の破断部がインク供給管4の開口部を塞ぐ事態を有効に回避するには、例えばインク供給管4の外周部に羽状のリブを複数設け、封止部材5の破断部を周囲に積極的に押し退けるように設計することが好ましい。このとき、上記リブとしては、インク供給管4の外周部外方向（円筒状インク供給管であればその径方向）に対して一定の高さ寸法をもって形成したもので差し支えないが、封止部材5の破断部に対する押し退け効果をより確実に発揮させるには、インク供給管4の先端部から管軸方向へ向かって高さが次第に高くなるように設計することが好ましく、この場合におけるリブのインク供給管4の外周部外方向に対する高さ差としては1～4mmが好ましい。

【0013】更に、上記インク供給管4の入り口部分には塵埃除去用フィルタを設けることが好ましい。このフィルタは濾過精度が10～40μmを達成できるものが好ましく、具体的には、SUSメッシュ、若しくは、SUSの細線をフェルト状にし、更に圧縮焼結させたものを基材としたフィルタが使用できる。

【0014】また、第二の技術的課題（インクタンクの抜き差しに伴う気泡の発生）を解決する発明は、図1（b）に示すように、インクIを含浸してなるインク吸収体2が内蔵され、インク供給用のタンク開口1a及び大気圧連通口1bが開設されているインクタンク1と、このインクタンク1が着脱自在に装着され、インクタンク1装着時にタンク開口1aに挿入連結されてインク吸収体2に圧接配置されるインク供給管4を有し、このインク供給管4を介して供給されるインクタンク1からのインクIを画像情報に応じて吐出するインクジェットヘッド3とを備えたインクジェットカートリッジであって、タンク開口1aの内周縁に内方に突出してインク吸収体2が圧縮される筒状部7を設けたことを特徴とするものである。

【0015】このような技術的手段において、上記筒状部7の形状等は任意であるが、筒状部7のインクタンク1内側への突出寸法については、少なくともタンク開口1a内に挿入されるインク供給管4の挿入寸法よりも小さいことが必要である。また、上記筒状部7の外周壁形状については適宜選定して差し支えないが、インク吸収体2とインクタンク1内壁に隙間が形成されると、気泡溜まりができ易いため、この気泡溜まりの発生を回避するには、筒状部7の外周壁形状を基部側に向かって末広がり状の滑らかなテーパとして形成することが好ましい。

【0016】更に、第三の技術的課題（インクタンク取り外し時のインクタンク外周部のインク付着）を解決する発明は、図1（b）に示すように、インクIを含浸してなるインク吸収体2が内蔵され、インク供給用のタンク開口1a及び大気圧連通口1bが開設されているインクタンク1と、このインクタンク1が着脱自在に装着され、インクタンク1装着時にタンク開口1aに挿入連結されてインク吸収体2に圧接配置されるインク供給管4を有し、このインク供給管4を介して供給されるインクタンク1からのインクIを画像情報に応じて吐出するインクジェットヘッド3とを備えたインクジェットカートリッジであって、インクタンク1のタンク開口1aの外周縁にはインク供給管4のフランジ部4aとの間に介在する弾性シール部材9が収容される凹所8を設けたことを特徴とするものである。

【0017】このような技術的手段において、上記凹所8としては、凹所8の底面にインクIが付着していても、当該インクIに作業者の手が届かないように大きさ、深さを選定することが必要であり、当該凹所8の底面とインク供給管4のフランジ部4aとの間に弾性シール部材9が密着してインクの流出を阻止することができるように設計すればよい。この場合において、例えば弾性シール部材9の圧縮時における厚さ寸法が1.8mm程度であれば、上記凹所8の深さ寸法は0.5～1.5mm程度がよい。

【0018】また、これらのインクジェットカートリッジにおいては、インクタンク1若しくはインクジェットヘッド3が別個独立に取引対象になり得るものである。従って、非インク浸透性材料からなる破砕可能な封止部材5にてタンク開口1aを封止したインクタンク1、あるいは、インク供給管4に、インクタンク1装着時にインク供給管4がタンク開口1aの封止部材5に圧接した際に封止部材5が破砕される破砕助長部6を形成したインクジェットヘッド3、あるいは、タンク開口1aの内周縁に内方に突出してインク吸収体2が圧縮される筒状部7を設けたインクタンク1、あるいは、タンク開口1aの外周縁には、インク供給管4のフランジ部4aとの間に介在する弾性シール部材9が収容される凹所8を設けたインクタンク1をも本願発明の対象とした。

#### 【0019】

【作用】上述したような技術的手段において、第一の技術的課題を解決する発明にあつては、インクタンク1交換時には、インクタンク1をパッケージから取り出し、そのままインクジェットヘッド3側のタンク保持部に差し込む。すると、インクタンク1のタンク開口1aを塞ぐ封止部材5にはインクジェットヘッド3側のインク供給管4が圧接するが、インク供給管4の破砕助長部6が封止部材5の破砕を助長し、インク供給管4の突き破りによってタンク開口1aの封止部材5が破砕し、インク供給管4がタンク開口1a内に挿入連結される。

【0020】また、第二の技術的課題を解決する発明にあつては、インクタンク1のタンク開口1a内周縁には内方に突出する筒状部7が形成されており、この筒状部7がインクタンク1内のインク吸収体2を部分的に圧縮するため、タンク開口1aに面した領域のインク吸収体2の密度は特に密になっている。従つて、インクタンク1はインクジェットヘッド3に装着される以前からタンク開口1a周辺に対し毛細管現象によりインクIが集中した状態に保たれる。それゆえ、インク吸収体2にインクIが充分に含浸している状態で、インクジェットヘッド3に対しインクタンク1を抜き差ししたとしても、もともとインク吸収体2は筒状部7によって圧縮変形している関係上、インク供給管2の接触の有無に基づくインク吸収体2の伸縮量は極めて少なく、その分、インク吸収体2の伸縮に伴う気泡の発生は減少する。

【0021】更に、第三の技術的課題を解決する発明にあつては、インクタンク1のタンク開口1aの外周縁に凹所8が設けられ、この凹所8部分に弾性シール部材9が圧接する。従つて、インクタンク取り外し時等において、インクタンク1側からインクIが滲み出た場合には、弾性シール部材9圧接部にインクIが残留することになるが、当該インクIは凹所8の底部に付着しているに過ぎず、インクタンク1の一般外表面部分に付着することはない。

#### 【0022】

【実施例】以下、添付図面に示す実施例に基づいてこの発明を詳細に説明する。図2はこの発明が適用されたインクジェットカートリッジを用いたインクジェットカラープリンタの一実施例を示す。同図において、符号20はプリンタ本体であり、用紙トレイ21内の用紙25を用紙搬送ロール22を介して用紙受け23へ搬送する一方、各色成分のインク（この実施例ではシアン、マゼンタ、イエロ、ブラック）が使用される各色成分のインクジェットカートリッジ30（具体的には30a～30d）をプリンタ本体20内に着脱自在に取り付け、インタフェースケーブル24から送り込まれる各色成分の画像情報に基づいて対応するインクジェットカートリッジ30を移動走査し、搬送されてきた用紙25上に各色成分のインク画像を書き込むようにしたものである。尚、

図中符号26はインクジェットカートリッジ30交換用の開閉蓋、27は手差しで用紙25を供給する手差しトレイ、28はプリント指示をするためのコンソールパネルである。

【0023】この実施例において、各色成分のインクジェットカートリッジ30は、図3及び図4に示すように、インクが充填されるインクタンク40及びこのインクタンク40が着脱自在に装着されるインクジェットヘッド50にて構成され、走査用キャリッジ31上に着脱自在に装着されるようになっている。この実施例において、走査用キャリッジ31は、主走査方向に直交する幅方向の両側を一对のガイドロッド32、33にて摺動案内支持するものであり、各インクジェットカートリッジ30が収容保持される四つの収容凹部34を有し、各収容凹部34の幅方向両側には収容されたインクジェットカートリッジ30の幅方向位置が拘束される位置決め壁35、36を設けたものである。そして、この走査用キャリッジ31は、コンソールパネル28からのプリント指示に従つて主走査方向に沿つて適宜移動走査し、インクジェットヘッド50から画像情報に応じてインク滴を吐出するようになっている。尚、図4中、符号37は走査中のキャリッジ31位置を検出してフィードバック制御を行うためのセンサ、38はキャリッジ31を駆動するためのタイミングベルトである。

【0024】また、この実施例で用いられるインクタンク40の詳細を図5～図7に示す。同図において、インクタンク40は略中空直方体形状のもので、一側面が開口したボックス本体401と、このボックス本体401の一側面を閉塞する側蓋402とで構成されており、夫々の要素がいずれも耐インク性の素材、例えばポリエステル樹脂にて型成形される。そして、上記インクタンク40内には、インクタンク40の縦断面形状に対応する縦断面五角形状のインク吸収体41が内蔵されており、この実施例におけるインク吸収体41は例えばフェルトにて構成され、所定の色インクを充分に含浸させている（この実施例では、インク吸収体41の容積が43ccである場合にインク容量が35～37cc程度）。

【0025】また、上記インクタンク40の底壁404には円形のタンク開口42が開設されており、一方、インクタンク40の上壁405の一端側には膨出部406が形成され、この膨出部406の中央にはインクタンク40内に連通する極めて小径の大気圧連通口43が開設されている。尚、符号407はインクタンク40不使用時に大気圧連通口43を封止する封止テープ、符号408はインクタンク40の上壁405に形成されるタンク把持部である。

【0026】更に、上記タンク開口42は、非インク浸透性の素材からなる矩形状の熱融着性フィルム44で封止されている。この実施例においては、上記熱融着性フィルム44は例えばアルミ箔とポリエチレンとの多層構

造ラミネート材料からなる厚さ70～120 $\mu$ m程度の  
もので、タンク開口42外周面に熱融着にて接着され  
る。

【0027】更にまた、この実施例においては、上記タ  
ンク開口42の内周縁には筒状部45が形成されてお  
り、この筒状部45は、特に図7に示すように、インク  
タンク40の内方に向かって約4mm程度突出し、その  
外周面及び内周面がインクタンク40の底壁404に向  
かって末広がり形状に拡開している。そしてまた、上記  
タンク開口42の外周縁にはインクタンク40の内方側  
に窪む凹所46が形成されている。

【0028】また、この実施例においては、上記インク  
タンク40の両側壁内面にはインク吸収体41に食い込  
む微小突起410が適宜数形成されており、これによ  
り、インク吸収体41の上下方向のズレを防止するよ  
うになっている。また、上記インクタンク40の両側壁内  
面の上部には、複数のリブ411が相互に離間した状態  
で対向配置されており、インクタンク40内のインク吸  
収体41の上面が各リブ411の下端面に当接し、大気  
圧連通口43からの大気がインク吸収体41の上面に均  
一に作用するようになっている。尚、符号412はイン  
クタンク40の側壁外面に形成され、後述するインクジ  
ェットヘッド50のタンク保持ケース53に挿入係止さ  
れる際に、タンク保持ケース53の係止孔534に係脱  
する係止突起である。

【0029】また、この実施例で用いられるインクジ  
ェットヘッド50の詳細を図8～図14に示す。図8及び  
図9において、インクジェットヘッド50は、供給され  
たインクが画像情報に応じて吐出されるヘッド本体51  
と、このヘッド本体51から生ずる熱を放出するヒート  
シンク52と、このヒートシンク52に取付られてイン  
クタンク40を着脱自在に保持するタンク保持ケース5  
3と、このタンク保持ケース53に保持されたインクタ  
ンク40とヘッド本体51とを連通するインク供給部材  
54と、上記ヒートシンク52上に設けられ、電気コネ  
クタ551から取り込まれた画像情報をヘッド本体51  
側へ供給する電気基板55とを備えている。

【0030】この実施例において、上記タンク保持ケ  
ース53は、図8に示すように、左右に分割されたケー  
ス部材531及び532を接合したものであり、ケース部  
材531、532の略中央部には、挿入されたインクタ  
ンク40を押さえ込む弾性押さえ片が設けられ、また、  
ケース部材531、532の上部中央には弾性変形可能  
な切り込み片533が形成され、この切り込み片533  
部分にインクタンク40が挿入保持される際にインクタ  
ンク40の係止突起412を係止する係止孔534が形  
成されている。

【0031】また、この実施例において、上記インク供  
給部材54は、インクタンク40のタンク開口42に挿  
入接続されるインク供給管60と、このインク供給管6

0とヘッド本体51とを連通するマニホールド70とで  
構成されている。上記インク供給管60は、特に図1  
0、図11に示すように、円筒管部61と、この円筒管  
部61の基部側において半径方向に突設されるフランジ  
部62と、このフランジ部62の円筒管部61との付け  
根部に形成されてリング68が係止されるリング係  
止溝63と、円筒管部61の先端に例えば4ヶ所等角度  
間隔で突設された鋭利な突起部64と、この突起部64  
とつながって円筒管部61の外周面に沿って延びるリブ  
65とで構成されている。特に、この実施例において  
は、上記突起部64は円筒管部61の内周面位置から外  
方に向かう傾斜エッジ64aを有し、その鋭利端64b  
を円筒管部61の外周面位置に配置したものであり、上  
記リブ65は円筒管部61の基部側に向かって次第に高  
さが増加する山型形状になっている。更に、この実施  
例では、上記インク供給管60の先端側には例えばSUS  
メッシュからなる塵埃除去フィルタ66が装着されてい  
る。この塵埃除去フィルタ66は例えば0.9mm厚の  
もので、円筒管部61の先端内周縁に形成された受け溝  
61aに圧入して取り付けられており、この塵埃除去フ  
ィルタ66の先端面は円筒管部61の先端一般面から僅  
かにk（この実施例では0.4mm）だけ突出配置され  
るようになっている。

【0032】一方、マニホールド70は、例えばポリエ  
ーテルイミド樹脂で一体成形したもので、インク供給  
管60の基部がリング67を介して挿入連結される連結  
部71を有し、この連結部71から細い径寸法のインク  
供給管路72を設けると共に、このインク供給管路72  
の先端にはヘッド本体51の長さ方向に沿って延びる長  
尺な液室73を形成し、この液室73の底部に面した領  
域にスリット開口74を開設したものである。尚、符号  
75はマニホールド70をヒートシンク52に位置決め  
固定するための位置決めボスである。また、この実施  
例において、上記液室73は、特に図12、図14に示す  
ように、インク供給管路72との連通部位置から下方側  
に向かって次第に裾広がり形状の壁面731（水平方向  
に対して角度 $\alpha$ ：この実施例では25°～45°）を有  
しており、インク供給管路72から液室73内に入り込  
んだインクIが直ちに液室73内に充填されるようにな  
っている。

【0033】また、この実施例において、ヘッド本体5  
1は、特に図12、図13に示すように、複数の断面三  
角形状の溝（チャネル）512を有する溝基板511  
と、この溝基板511に対向配置される発熱体基板51  
3とで構成され、共通インク室525に連通する断面三  
角状の多数のノズル526を画素密度単位で配列したも  
のである。上記溝基板511はSiウエハの異方性エッ  
チングにより製作される。一方、発熱体基板513に  
は、Siウエハ514上にSiO<sub>2</sub>の蓄熱層515、多  
結晶シリコンからなる発熱抵抗体516、Al-Cuか



らなる通電電極517、発熱抵抗体516及び通電電極517を被覆するSiNxからなる第一保護層518、この第一保護層518上に積層されるTaからなる第二保護層519、発熱抵抗体516に対応する部分にビット開口（パブルの生成消滅を閉じ込め、インク噴射を安定化する）521を有する感光性ポリイミドからなるビット層520が夫々設けられている。尚、図12中、符号522は電気基板55とヘッド本体51の通電電極517とを電氣的に接続するボンディングワイヤである。

【0034】また、この実施例においては、上記マニホールド70のスリット開口74に対応するヘッド本体51の溝基板511には複数の連通孔523が開設され、マニホールド70の液室73からのインクIがヘッド本体51の共通インク室525に均一に供給されるようになっている。

【0035】次に、この実施例に係るインクジェットカートリッジに対するインクタンクの交換作業について説明する。インクタンク40交換時には、図15に示すように、インクタンク40をパッケージから取り出し、そのままインクジェットヘッド50のタンク保持ケース53に差し込む。このとき、図16に示すように、インク供給管60の突起部61がインクタンク40のタンク開口42を塞いでいる熱融着性フィルム44に衝合するが、上記突起部61が熱融着性フィルム44を破断し始め、上記インク供給管60がタンク開口42に挿入されていくと、インク供給管60の外周部に形成されたリブ65が熱融着性フィルム44の破断部を積極的に周囲に押し退け、熱融着性フィルム44の破断部がちぎれてインク供給管60の開口部を塞ぐ事態を回避する。この状態で、上記インク供給管60がタンク開口42に挿入結合され、インク供給管60の円筒管部61の先端一般面がインクタンク40の筒状部45より僅かに（この実施例ではm（図17参照）＝4mm程度）だけ突出配置される。すると、特に図17に示すように、インク供給管60の突起部64はインク吸収体41に没入し、インク供給管60とインク吸収体41との機械的結合が図られると共に、円筒管部61の先端に圧入した塵埃除去フィルタ66の表面がインク吸収体41に圧接し、インク供給管60とインク吸収体41との流体的結合が図られる。この後、プリンタ本体側にある図示外の負圧発生装置によりヘッド本体51のノズル526側を強制的に負圧状態とし、インク吸収体41からヘッド本体51の共通インク室525までインクを充填させれば、インクの吐出動作に対する準備が完了する。従って、インクジェットヘッド50側でインクの吐出動作が行われると、ヘッド本体51側の共通インク室525が負圧状態になり、これに伴って、インクタンク40のインク吸収体41から毛細管現象によりインクIがインク供給管60及びマニホールド70からなるインク供給部材54を介してヘッド本体51の共通インク室525に供給される。

【0036】また、インク供給管60のOリング係止溝63にはOリング68が係止され、インク供給管60がタンク開口42に挿入結合される際に、インク供給管60のフランジ部62とインクタンク40の凹所46との間に上記Oリング68が密着配置され、インクタンク40内からのインクIの漏れを防止するようになっている。

【0037】また、この実施例において、例えばインクタンク40の装着状態を再度やり直すような場合、図18に示すように、インクタンク40を抜き差しすることになるが、仮に、インクタンク40を抜いたとしても、筒状部45がインク吸収体41を圧縮した状態に保っているため、インク吸収体41が極端に伸長することはない、再度インクタンク40をタンク開口42に挿入したとしても、インク吸収体41が極端に圧縮することはない。よって、インクタンク40を抜き差ししたとしても、インク吸収体41が大きく伸縮することはないので、インク吸収体41部分周りの伸縮に伴う気泡の発生はほとんどなく、気泡がインク供給部材54を通じてヘッド本体51側へ混入する懸念はほとんどない。

【0038】更にまた、インクタンク40交換時やインクタンク40を一旦取り外すような場合、インクタンク40内から滲み出してくるインクIはOリング68圧接部に付着することになるが、当該Oリング68圧接部はインクタンク40のタンク開口42外周部の凹所46であるため、インク付着部位はインクタンク40の一般外表面から窪んだ狭い箇所になり、作業者の手や他のものが触れたりしても、インクが付着し難い。

【0039】

【発明の効果】以上説明してきたように、請求項1～5いずれかに記載の発明によれば、インクタンクを交換する際に、針状の供給管を用いることなく、しかも、テープ若しくは蓋を剥すことなく、単にインクジェットヘッド側のタンク保持部にインクタンクを挿入すれば、自動的にインク供給可能な状態で連結できるようにしたので、インクタンク交換作業の安全性を確保し、かつ、インクによる汚れを有効に防止しながら、インクタンクの交換作業を極めて簡単に行うことができる。

【0040】また、請求項6記載の発明によれば、インクタンクの抜き差しによってインク吸収体が伸縮しない構成を採用したので、仮に、インクタンクを抜き差ししたとしても、インク吸収体の伸縮に伴う気泡の発生を回避することができ、インクジェットヘッドへのインク供給部材内部に混入する気泡を最小限に抑え、インクジェットヘッドのインク吐出動作を安定化させることができ、画質を良好に保つことができる。

【0041】更に、請求項7記載の発明によれば、インクタンク取り外し時において、インクがインクタンクの一般外周面に露呈しない構成を採用したので、仮に、インクタンクを取り外したとしても、作業者の手や周囲の

ものにインクが付着する事態を有効に防止することができる。

【0042】特に、請求項8、9、10、11記載の発明によれば、上述したような効果が得られるインクジェットカートリッジを構成するインクタンクあるいはインクジェットヘッドを有効に擁護することができる。

【図面の簡単な説明】

【図1】 (a) (b)はこの発明に係るインクジェットカートリッジの夫々別異の構成を示す説明図である。

【図2】 この発明が適用されたインクジェットカートリッジを用いたカラーインクジェットプリンタの一実施例を示す説明図である。

【図3】 実施例に係るインクジェットカートリッジの全体構成を示す分解斜視図である。

【図4】 その取付状態を示す正面説明図である。

【図5】 実施例で用いられるインクタンクの詳細を示す分解斜視図である。

【図6】 実施例で用いられるインクタンクの底部構造を示す説明図である。

【図7】 実施例で用いられるインクタンクのタンク開口部構造を示す断面説明図である。

【図8】 実施例に係るインクジェットヘッドの詳細を示す分解斜視図である。

【図9】 実施例に係るインクジェットヘッドのヘッド

本体及びインク供給部材の関係を示す説明図である。

【図10】 実施例に係るインク供給部材の詳細を示す分解斜視図である。

【図11】 その断面説明図である。

【図12】 ヘッド本体とインク供給部材との関係を示す一部破断拡大説明図である。

【図13】 ヘッド本体の詳細を示す断面説明図である。

【図14】 ヘッド本体とインク供給部材の液室との関係を示す図12中矢印XIV方向から見た説明図である。

【図15】 実施例に係るインクジェットカートリッジのインクタンク交換前の状態を示す説明図である。

【図16】 実施例に係るインクジェットカートリッジのインクタンク交換後の状態を示す説明図である。

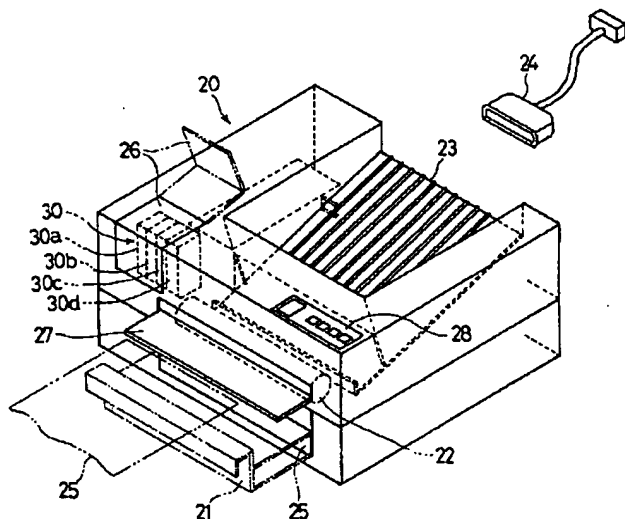
【図17】 図16中XVII部拡大図である。

【図18】 インクタンク取り外し時の状態を示す説明図である。

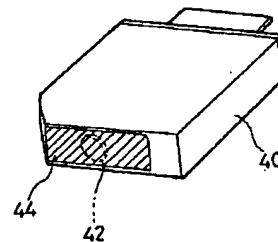
【符号の説明】

1…インクタンク、1a…タンク開口、1b…大気圧連通口、2…インク吸収体、3…インクジェットヘッド、4…インク供給管、4a…フランジ部、5…封止部材、6…破砕助長部、7…筒状部、8…凹所、9…弾性シール部材

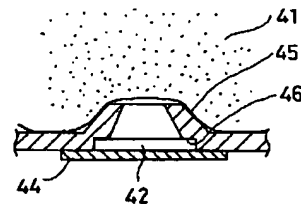
【図2】



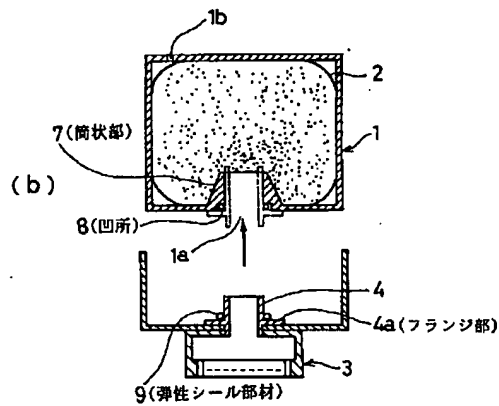
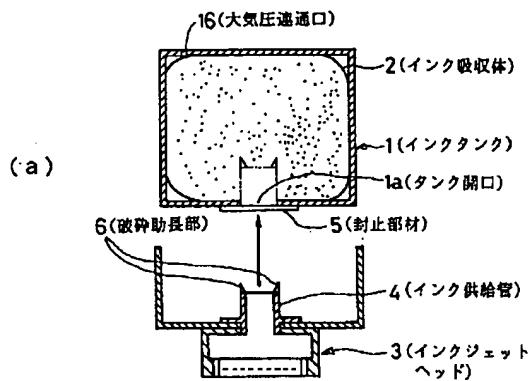
【図6】



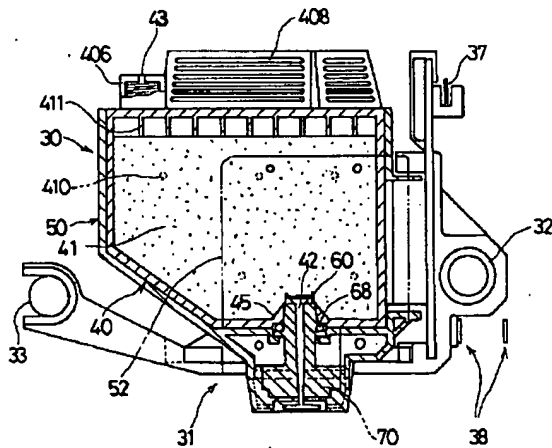
【図7】



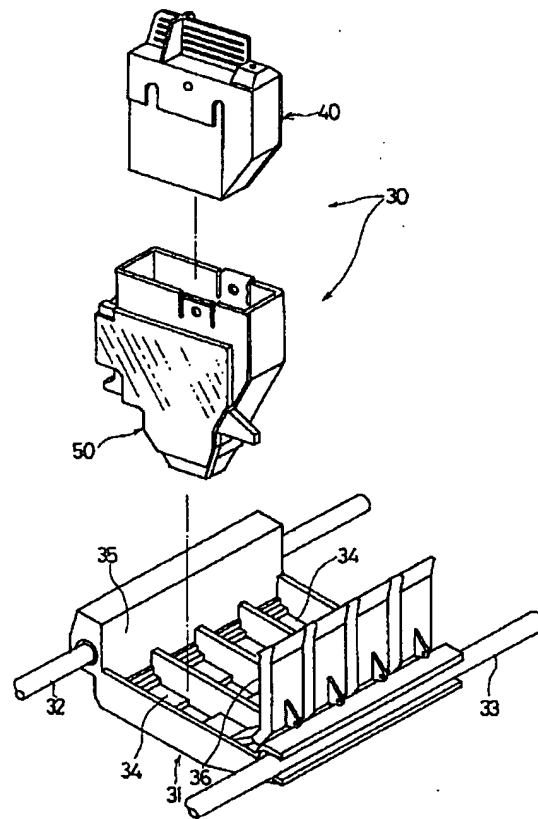
【図1】



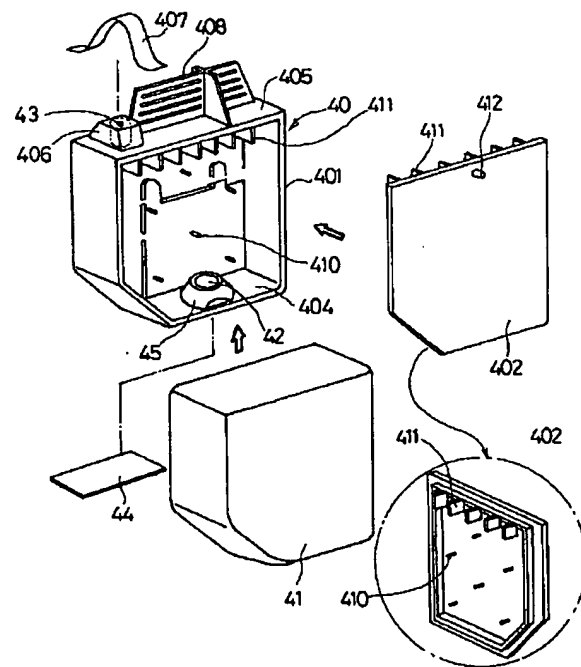
【図4】



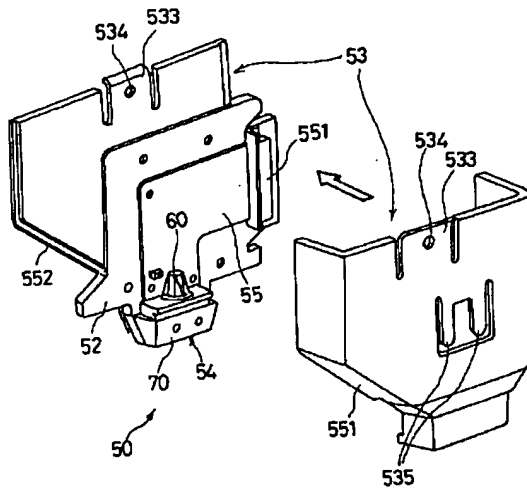
【図3】



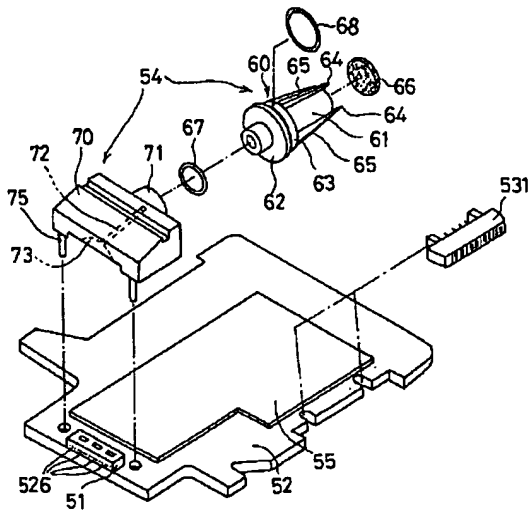
【図5】



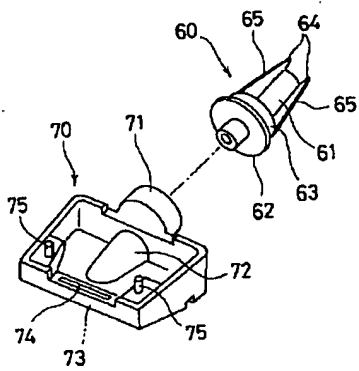
【図8】



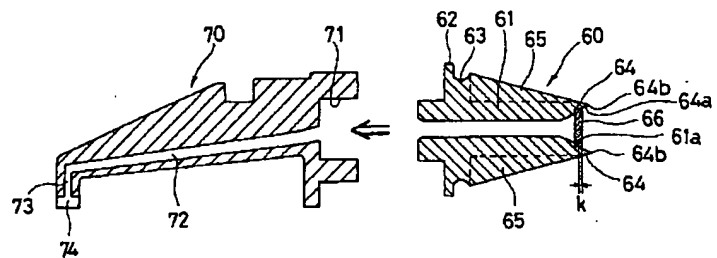
【図9】



【図10】

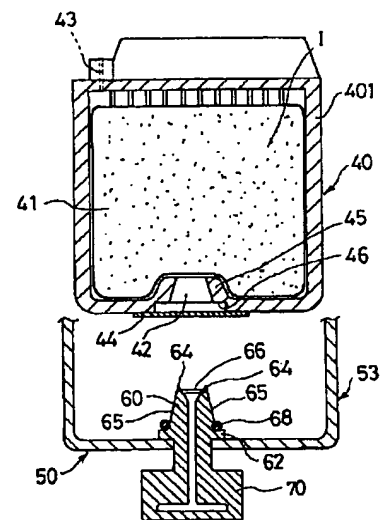
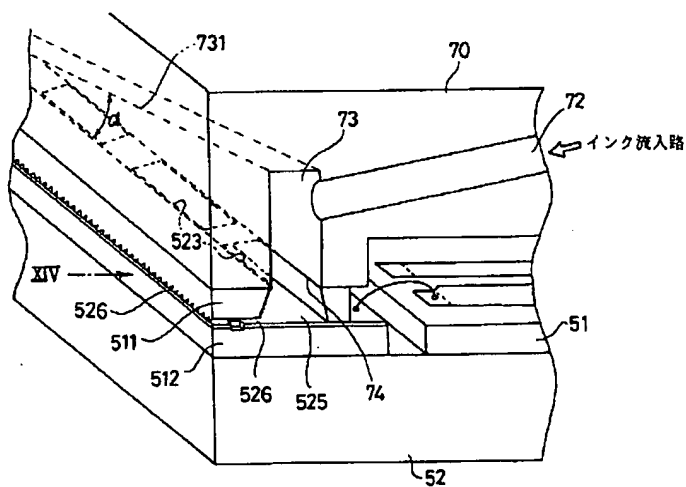


【図11】



【図15】

【図12】





フロントページの続き

(72)発明者 石瀬 達弘  
神奈川県海老名市本郷2274番地 富士ゼロ  
ックス株式会社海老名事業所内

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CLAIMS

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[Claim(s)]

[Claim 1] The ink tank by which the ink absorber (2) which comes to sink in in ink (I) is built in, and tank opening (1a) and atmospheric pressure free passage opening (1b) for ink supply are established (1), It is equipped with this ink tank (1) free [ attachment and detachment ], and has the ink supply pipe (4) by which pressure-welding arrangement is carried out by carrying out insertion connection at tank opening (1a) at an ink absorber (2) at the time of ink tank (1) wearing. It is the ink jet cartridge equipped with the ink jet head (3) which carries out the regurgitation of the ink (I) from the ink tank (1) supplied through this ink supply pipe (4) according to image information. Tank opening (1a) of an ink tank (1) is closed by the closure member (5) which consists of a non-ink permeability ingredient and which can be crushed. On the other hand, to the ink supply pipe (4) of an ink jet head (3) The ink jet cartridge characterized by forming the crushing promotion section (6) by which a closure member (5) is crushed when an ink supply pipe (4) carries out a pressure welding to the closure member (5) of tank opening (1a) in the time of ink tank (1) wearing.

[Claim 2] It is the ink jet cartridge characterized by the closure member (5) consisting of heat welding nature films in a thing according to claim 1.

[Claim 3] It is the ink jet cartridge characterized by having 1 by which the crushing promotion section (6) was formed at the head of an ink supply pipe (4) in the thing according to claim 1, or two or more sharp projections.

[Claim 4] It is the ink jet cartridge characterized by having two or more ribs with which the crushing promotion section (6) was formed in the periphery section of an ink supply pipe (4) in the thing according to claim 1.

[Claim 5] The ink jet cartridge characterized by preparing the filter for dust clearance in the entry part of an ink supply pipe (4) in a thing according to claim 1.

[Claim 6] The ink tank by which the ink absorber (2) which comes to sink in in ink (I) is built in, and tank opening (1a) and atmospheric pressure free passage opening (1b) for ink supply are established (1), It is equipped with this ink tank (1) free [ attachment and detachment ], and has the ink supply pipe (4) by which pressure-welding arrangement is carried out by carrying out insertion connection at tank opening (1a) at an ink absorber (2) at the time of ink tank (1) wearing. It is the ink jet cartridge equipped with the ink jet head (3) which carries out the regurgitation of the ink (I) from the ink tank (1) supplied through this ink supply pipe (4) according to image information. The ink jet cartridge characterized by preparing the tubed part (7) into which it projects on the inner circumference edge of tank opening (1a) in the inner direction, and an ink absorber (2) is compressed.

[Claim 7] The ink tank by which the ink absorber (2) which comes to sink in in ink (I) is built in, and tank opening (1a) and atmospheric pressure free passage opening (1b) for ink supply are established (1), It is equipped with this ink tank (1) free [ attachment and detachment ], and has the ink supply pipe (4) by which pressure-welding arrangement is carried out by carrying out insertion connection at tank opening (1a) at an ink absorber (2) at the time of ink tank (1) wearing. It is the ink jet cartridge equipped with the ink jet head (3) which carries out the regurgitation of the ink (I) from the ink tank (1) supplied through this ink supply pipe (4) according to image information. The ink jet cartridge characterized by preparing the hollow (8) where the elastic seal member (9) which intervenes between the flanges (4a) of an ink supply pipe (4) is held in the periphery edge of tank opening (1a) of an ink tank (1).

[Claim 8] While the ink absorber (2) which comes to sink in in ink (I) is built in and tank opening (1a) and atmospheric pressure free passage opening (1b) for ink supply are established It is the ink tank by which insertion connection is carried out at tank opening (1a), and pressure-welding arrangement of the ink supply pipe (4) by the side of an ink jet head (3) is carried out at an ink absorber (2). The ink tank characterized by closing tank opening (1a) by the closure member (5) which consists of a non-ink permeability ingredient, and which can be crushed.

[Claim 9] While the ink absorber (2) which comes to sink in in ink (I) is built in and tank opening (1a) and atmospheric pressure free passage opening (1b) for ink supply are established It is the ink tank by which insertion connection is carried out at tank opening (1a), and pressure-welding arrangement of the ink supply pipe (4) by the side of an ink jet head (3) is carried out at an ink absorber (2). The ink tank characterized by preparing the tubed part (7) into which it projects on the inner circumference edge of tank opening (1a) in the inner direction, and an ink absorber (2) is compressed.

[Claim 10] While the ink absorber (2) which comes to sink in in ink (I) is built in and tank opening (1a) and atmospheric pressure free passage opening (1b) for ink supply are established It is the ink tank by which insertion connection is carried out at tank opening (1a), and pressure-welding arrangement of the ink supply pipe (4) by the side of an ink jet head (3) is carried out at an ink absorber (2). The ink tank characterized by preparing the hollow (8) where the elastic seal member (9) which intervenes between the flanges (4a) of an ink supply pipe (4) is held in the periphery edge of tank opening (1a).

[Claim 11] While the ink absorber (2) which comes to sink in in ink (I) is built in and tank opening (1a) and atmospheric pressure free passage opening (1b) for ink supply are established It is what equips with the ink tank (1) closed by the closure member (5) which tank opening (1a) becomes from a non-ink permeability ingredient, and which can be crushed free [ attachment and detachment ]. It has the ink supply pipe (4) by which pressure-welding arrangement is carried out by carrying out insertion connection at tank opening (1a) at an ink absorber (2) at the time of ink tank (1) wearing. It is the ink jet head which carries out the regurgitation of the ink (I) from the ink tank (1) supplied through this ink supply pipe (4) according to image information. To an ink supply pipe (4) The ink jet head characterized by forming the crushing promotion section (6) by which a closure member (5) is crushed when an ink supply pipe (4) carries out a pressure welding to the closure member (5) of tank opening (1a) in the time of ink tank (1) wearing.

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## DETAILED DESCRIPTION

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[Detailed Description of the Invention]



[0001]

[Industrial Application] This invention relates to an ink jet recording apparatus, and relates to the ink tank and ink jet head which are used for the ink jet cartridge list with which the body of an ink jet recording apparatus is equipped especially free [ attachment and detachment ] at this.

[0002]

[Description of the Prior Art] If it is in the ink jet recording device in the former, what equipped with the ink jet cartridge which consists of an ink jet head in which an ink tank is attached exchangeable from a viewpoint of raising the supply nature of ink, free [ attachment and detachment ] to the body of an ink jet recording device is already offered.

[0003] Conventionally, as this kind of an ink jet cartridge, while forming a needlelike supply pipe, for example in an ink jet head end, what infixes an elastic seal member in tank opening by the side of an ink tank, thrusts said needlelike supply pipe into this elastic seal member, and was made to make free passage connection of an ink tank and the ink jet head through the supply pipe is offered (refer to JP,3-87266,A). However, if it was in this type, since it was in the condition that it was exposed of the needlelike supply pipe of an ink jet head end at the time of ink tank exchange, there was a possibility that the needlelike supply pipe concerned might touch an operator's hand, and it was not desirable on activity insurance.

[0004] While a tubed ink supply pipe is projected for example, in an ink jet head end as a means to solve such a technical technical problem, make the ink absorber with which ink has sunk in into an ink tank build in, tank opening is made to carry out insertion connection of the ink supply pipe of an ink jet head end, and what was made to carry out pressure-welding arrangement of the ink supply pipe at an ink absorber is already offered (refer to JP,2-187364,A).

[0005]

[Problem(s) to be Solved by the Invention] However, if it was in this type, since it was required to usually close tank opening of the ink tank at the time of intact with a tape or a lid, after removing the tape or the lid and opening tank opening of an ink tank at the time of ink tank exchange, the ink tank concerned had to be connected to the ink jet head end. Therefore, if it was in this type, when removing about [ that the exchange of a part and an ink tank which the time and effort of removing a tape or a lid generates becomes troublesome ], a tape, or a lid, the first technical technical problem that the ink in an ink tank flew and an operator's hand was soiled by that oscillation etc. was found out.

[0006] Moreover, with the condition that the ink absorber inside an ink tank has still sunk in ink fully when checking the wearing condition of an ink tank again, for example, if it is in the type mentioned above, If an ink tank is taken out and inserted, since an ink absorber expands and contracts with insertion balking actuation of an ink supply pipe, The air bubbles of a large quantity mixed in the interior of the ink supply pipe to an ink jet head, and the second technical technical problem that the concern which spoils ink discharging of an ink jet head arose was found out.

[0007] Furthermore, although the structure which carries out the pressure welding of the packing material is usually adopted as the tank opening periphery section base of an ink tank in order to maintain the seal nature around [ tank opening ] an ink tank if it is in the type mentioned above If an ink tank is removed at the case where the wearing condition of an ink tank is checked again, or the time of ink tank exchange Ink adhered to the tank opening periphery section of the removed ink tank, and the third technical technical problem that the adhesion ink concerned touched an operator's hand, or soiled a perimeter environment was found out.

[0008] This invention is made in order to solve the above technical technical problem, it raises the exchange workability of an ink tank, and can control generating of the air bubbles accompanying extraction and insertion of an ink tank, and offers the ink tank and ink jet head which are further used for the ink jet cartridge list which prevented effectively ink adhesion of the ink tank periphery section at the time of ink tank removal at this.

[0009] Namely, the first invention which solves the first technical technical problem (exchange workability lowering of an ink tank) The ink tank 1 by which the ink absorber 2 which sinks in and becomes about Ink I is built in, and tank opening 1a for ink supply and atmospheric pressure free passage opening 1b are established as shown in drawing 1 a, It is equipped with this ink tank 1 free [ attachment and detachment ], and has the ink supply pipe 4 by which pressure-welding arrangement is carried out by carrying out insertion connection at tank opening 1a at the ink absorber 2 at the time of ink tank 1 wearing. It is the ink jet cartridge equipped with the ink jet head 3 which carries out the regurgitation of the ink I from the ink tank 1 supplied through this ink supply pipe 4 according to image information. Tank opening 1a of the ink tank 1 is closed by the closure member 5 which consists of a non-ink permeability ingredient and which can be crushed. On the other hand, to the ink supply pipe 4 of the ink jet head 3 When the ink supply pipe 4 carries out a pressure welding to the closure member 5 of tank opening 1a in the time of ink tank 1 wearing, it is characterized by forming the crushing promotion section 6 by which the closure member 5 is crushed.

[0010] What is necessary is to select suitably, and not to interfere, for example, just to stick a film with a thickness of about 20-200 micrometers in such technical means, if tank opening 1a is closed for the raw material of non-ink permeability and it is crushed in the crushing promotion section 6 as the above-mentioned closure member 5. At this time, the charge of a multilayer-structure laminate material which made the subject aluminum foil, polyethylene, or polyester and polyethylene, for example can be used as the above-mentioned film. In addition, adhesion by direct heat welding is also possible for this ingredient on the ink tank 1.

[0011] Moreover, if it promotes breaking through the closure member 5 by which tank opening 1a is closed with the ink supply pipe 4 as the above-mentioned crushing promotion section 6, a design change will be carried out suitably and it will not interfere. for example, a projection sharp at the head of the ink supply pipe 4 -- 1 -- or what is necessary is just to arrange more than one Since there is concern whose fracture section of the closure member 5 plugs up opening of the ink supply pipe 4 when many number of heights is set up too much at this time, it is required to select the number of heights, arrangement, etc. suitably. Moreover, in order to keep the crushing effectiveness of the closure member 5 good, it is desirable to arrange the above-mentioned height in the periphery section of the ink supply pipe 4, and to set the height of a height as about 1-3mm. Moreover, in case the reinforcement of a height breaks through the closure member 5, it needs to form with a tough ingredient so that it may not break or bend.

[0012] Moreover, in order to avoid effectively the situation where the fracture section of the closure member 5 plugs up opening of the ink supply pipe 4, as the above-mentioned crushing promotion section 6, it is desirable to design so that two or more feather-like ribs may be prepared in the periphery section of the ink supply pipe 4 and the fracture section of the closure member 5 may be pushed away positively around. Although it is what was formed with the fixed height dimension as the above-mentioned rib to the direction of a periphery outside of the ink supply pipe 4 (if it is a cylindrical ink supply pipe that direction of a path) and does not interfere at this time In order to push away to the fracture section of the closure member 5 and to demonstrate effectiveness more certainly In designing from the point of the ink supply pipe 4, so

that height may become high gradually toward the direction of a tube axis, it is desirable and 1-4mm is desirable as a height difference over the direction of a periphery outside of the ink supply pipe 4 of the rib which can be set in this case.

[0013] Furthermore, it is desirable to prepare the filter for dust clearance in the entry part of the above-mentioned ink supply pipe 4. This filter has that desirable to which a filtration accuracy can attain 10-40 micrometers, and can use the filter which used as the base material that which a SUS mesh or the thin line of SUS was made [ that ] into the shape of felt, and specifically carried out compression sintering further.

[0014] Moreover, invention which solves the second technical technical problem (generating of the air bubbles accompanying extraction and insertion of an ink tank) The ink tank 1 by which the ink absorber 2 which sinks in and becomes about Ink I is built in, and tank opening 1a for ink supply and atmospheric pressure free passage opening 1b are established as shown in drawing 1 (b), It is equipped with this ink tank 1 free [ attachment and detachment ], and has the ink supply pipe 4 by which pressure-welding arrangement is carried out by carrying out insertion connection at tank opening 1a at the ink absorber 2 at the time of ink tank 1 wearing. It is the ink jet cartridge equipped with the ink jet head 3 which carries out the regurgitation of the ink I from the ink tank 1 supplied through this ink supply pipe 4 according to image information. It is characterized by forming the tubed part 7 into which it projects on the inner circumference edge of tank opening 1a in the inner direction, and the ink absorber 2 is compressed.

[0015] In such technical means, although the configuration of the above-mentioned tubed part 7 etc. is arbitrary, about the projection dimension inside [ ink tank 1 ] a tubed part 7, it is required to be smaller than the insertion dimension of the ink supply pipe 4 inserted into tank opening 1a at least. Moreover, although it selects suitably and does not interfere about the peripheral-wall configuration of the above-mentioned tubed part 7, in order to avoid generating of this cellular \*\*\*\*\* since cellular \*\*\*\*\* tends to be made if a clearance is formed in ink absorber 2 and ink tank 1 wall, it is desirable is Mukai and to form the peripheral-wall configuration of a tubed part 7 in a base side as a smooth breadth-like taper at last.

[0016] Furthermore, invention which solves the third technical technical problem (ink adhesion of the ink tank periphery section at the time of ink tank removal) The ink tank 1 by which the ink absorber 2 which sinks in and becomes about Ink I is built in, and tank opening 1a for ink supply and atmospheric pressure free passage opening 1b are established as shown in drawing 1 (b), It is equipped with this ink tank 1 free [ attachment and detachment ], and has the ink supply pipe 4 by which pressure-welding arrangement is carried out by carrying out insertion connection at tank opening 1a at the ink absorber 2 at the time of ink tank 1 wearing. It is the ink jet cartridge equipped with the ink jet head 3 which carries out the regurgitation of the ink I from the ink tank 1 supplied through this ink supply pipe 4 according to image information. It is characterized by forming the hollow 8 where the elastic seal member 9 which intervenes between flange 4a of the ink supply pipe 4 is held in the periphery edge of tank opening 1a of the ink tank 1.

[0017] What is necessary is it to be required to select magnitude and the depth so that an operator's hand may not reach the ink I concerned, and for the elastic seal member 9 to stick between the base of the hollow 8 concerned, and flange 4a of the ink supply pipe 4, and just to design as the above-mentioned hollow 8, in such technical means, so that runoff of ink may be prevented and may be possible even if Ink I has adhered to the base of a hollow 8. In this case, if the thickness dimension at the time of compression of the elastic seal member 9 is about 1.8mm, the depth dimension of the above-mentioned hollow 8 has about 0.5-1.5mm good [ it sets for example, ].

[0018] Moreover, in these ink jet cartridges, the ink tank 1 or the ink jet head 3 can become an object for dealings separately independently. Therefore, the ink tank 1 which closed tank opening 1a by the closure member 5 which consists of a non-ink permeability ingredient, and which can be crushed, or the ink jet head 3 in which the crushing promotion section 6 in which the closure member 5 is crushed by the ink supply pipe 4 when the ink supply pipe 4 carries out a pressure welding to the closure member 5 of tank opening 1a in the time of ink tank 1 wearing was formed -- or The ink tank 1 which formed the tubed part 7 into which it projects on the inner circumference edge of tank opening 1a in the inner direction, and the ink absorber 2 is compressed, Or the ink tank 1 which formed the hollow 8 where the elastic seal member 9 which intervenes between flange 4a of the ink supply pipe 4 is held in the periphery edge of tank opening 1a was also set as the object of the invention in this application.

[0019]

[Function] In technical means which were mentioned above, if it is in invention which solves the first technical technical problem, at the time of ink tank 1 exchange, the ink tank 1 is picked out from a package, and it inserts in the tank attaching part by the side of the ink jet head 3 as it is. then -- although the ink supply pipe 4 by the side of the ink jet head 3 carries out a pressure welding to the closure member 5 which closes tank opening 1a of the ink tank 1 -- the crushing promotion section 6 of the ink supply pipe 4 -- crushing of the closure member 5 -- promoting -- the ink supply pipe 4 -- breaking through -- the closure member 5 of tank opening 1a crushes, and insertion connection of the ink supply pipe 4 is carried out into tank opening 1a.

[0020] Moreover, if it is in invention which solves the second technical technical problem, in order that the tubed part 7 which projects in the inner direction may be formed in the tank opening 1a inner circumference edge of the ink tank 1 and this tubed part 7 may compress selectively the ink absorber 2 in the ink tank 1, the consistency of the ink absorber 2 of the field facing tank opening 1a is dense especially. Therefore, before equipping the ink jet head 3 with the ink tank 1, it is maintained at the condition that Ink I focused from from by capillarity to the tank opening 1a circumference. So, even if it takes out and inserts the ink tank 1 to the ink jet head 3 in the condition that Ink I has fully sunk in, to the ink absorber 2, from the first, the amount of telescopic motion of the ink absorber 2 based on the existence of contact of the ink supply pipe 2 has very little ink absorber 2 on the relation which is carrying out the compression set by the tubed part 7, and generating of the air bubbles accompanying telescopic motion of the part and the ink absorber 2 decreases.

[0021] Furthermore, if it is in invention which solves the third technical technical problem, a hollow 8 is established in the periphery edge of tank opening 1a of the ink tank 1, and the elastic seal member 9 carries out a pressure welding to this hollow 8 part. therefore, in the time of ink tank removal etc., although Ink I will remain in the elastic seal member 9 pressure-welding section when Ink I oozes from the ink tank 1 side, the ink I concerned adheres to the pars basilaris ossis occipitalis of a hollow 8 -- \*\*\*\* -- it does not pass and does not adhere to the general outside-surface part of the ink tank 1

[0022]

[Example] Hereafter, this invention is explained to a detail based on the example shown in an accompanying drawing. Drawing 2 shows one example of the ink-jet color printer using the ink jet cartridge to which this invention was applied. While a sign 20 is a body of a printer and the form 25 in the form tray 21 is conveyed to the form receptacle 23 through the form conveyance roll 22 in this drawing The ink jet cartridge 30 (specifically 30a-30d) of each color component for which the ink (this example cyanogen, a Magenta, Hierro, black) of each color component is

used is attached free [ attachment and detachment ] in the body 20 of a printer. The migration scan of the ink jet cartridge 30 which corresponds based on the image information of each color component sent in from the interface cable 24 is carried out, and the ink image of each color component is written in on the conveyed form 25. In addition, the closing motion lid for ink jet cartridge 30 exchange in the sign 26 in drawing, the manual bypass tray to which 27 supplies a form 25 by manual bypass, and 28 are the console panels for carrying out print directions.

[0023] In this example, as shown in drawing 3 and drawing 4 , the ink jet cartridge 30 of each color component consists of ink jet heads 50 with which it is equipped free [ the ink tank 40 by which it fills up with ink and attachment and detachment of this ink tank 40 ], and it is equipped with it free [ attachment and detachment ] on the carriage 31 for a scan. In this example, the carriage 31 for a scan carries out sliding advice support of the both sides of the cross direction which intersects perpendicularly with a main scanning direction by the guide rods 32 and 33 of a couple, has four hold crevices 34 where hold maintenance of each ink jet cartridge 30 is carried out, and forms the positioning walls 35 and 36 with which the crosswise location of the held ink jet cartridge 30 is restrained in the crosswise both sides of each hold crevice 34. And this carriage 31 for a scan carries out a migration scan suitably along a main scanning direction according to the print directions from a console panel 28, and carries out the regurgitation of the ink droplet according to image information from the ink jet head 50. In addition, the sensor for a sign 37 detecting carriage 31 location under scan, and performing feedback control and 38 are the timing belts for driving carriage 31 among drawing 4 .

[0024] Moreover, the detail of the ink tank 40 used in this example is shown in drawing 5 - drawing 7 . In this drawing, the ink tank 40 is the thing of an abbreviation hollow rectangular parallelepiped configuration, it consists of a box body 401 in which one side face carried out opening, and a side lid 402 which blockades one side face of this box body 401, and die forming of each of each element is carried out with the raw material of ink-proof nature, for example, polyester resin. And in the above-mentioned ink tank 40, the ink absorber 41 of the longitudinal-section 5 angle configuration corresponding to the longitudinal-section configuration of the ink tank 40 is built in, and the ink absorber 41 in this example consists of felt, and fully carries out impregnation of the predetermined color ink (when the volume of the ink absorber 41 is 43 cc in this example, ink capacity is about 35-37 cc).

[0025] Moreover, the circular tank opening 42 is established by the bottom wall 404 of the above-mentioned ink tank 40, on the other hand, the swelling section 406 is formed in the end side of the upper wall 405 of the ink tank 40, it reaches [ it is open for free passage, ] to an extreme in the ink tank 40, in the center of this swelling section 406, and the atmospheric pressure free passage opening 43 of a minor diameter is established. In addition, the closure tape on which a sign 407 closes the atmospheric pressure free passage opening 43 at the time of ink tank 40 un-using it, and a sign 408 are the tank grasping sections formed in the upper wall 405 of the ink tank 40.

[0026] Furthermore, the above-mentioned tank opening 42 is closed with the heat welding nature film 44 of the shape of a rectangle which consists of a raw material of non-ink permeability. In this example, the above-mentioned heat welding nature film 44 is a thing with a thickness of about 70-120 micrometers it is thin from the charge of a multilayer-structure laminate material of aluminum foil and polyethylene, and is pasted up on tank opening 42 peripheral face in heat welding.

[0027] Furthermore, in this example, the tubed part 45 is formed in the inner circumference edge of the above-mentioned tank opening 42, and as shown in drawing 7 , a projection, its peripheral

face, and inner skin have extended especially this tubed part 45 in the breadth configuration at last toward the bottom wall 404 of the ink tank 40 again toward a way about 4mm among the ink tanks 40. And the hollow 46 which becomes depressed in a way side among the ink tanks 40 is formed in the periphery edge of the above-mentioned tank opening 42 again.

[0028] Moreover, in this example, number formation of the minute projection 410 which eats into the ink absorber 41 is carried out suitably at the both-sides wall inner surface of the above-mentioned ink tank 40, and this prevents gap of the vertical direction of the ink absorber 41.

Moreover, opposite arrangement of two or more ribs 411 is carried out in the condition of having estranged mutually in the upper part of the both-sides wall inner surface of the above-mentioned ink tank 40, the top face of the ink absorber 41 in the ink tank 40 contacts the soffit side of each rib 411, and the atmospheric air from the atmospheric pressure free passage opening 43 acts on the top face of the ink absorber 41 at homogeneity. In addition, a sign 412 is a stop projection which engages and releases the stop hole 534 of the tank maintenance case 53, in case an insertion stop is carried out at the tank maintenance case 53 of the ink jet head 50 which it is formed in the side-attachment-wall outside surface of the ink tank 40, and is mentioned later.

[0029] Moreover, the detail of the ink jet head 50 used in this example is shown in drawing 8 - drawing 14. In drawing 8 and drawing 9 the ink jet head 50 The head body 51 with which the supplied ink is breathed out according to image information, with the heat sink 52 which emits the heat produced from this head body 51, and the tank maintenance case 53 held for the mounting \*\*\*\* ink tank 40 to this heat sink 52, enabling free attachment and detachment It was prepared the ink feed zone material 54 which opens for free passage the ink tank 40 held at this tank maintenance case 53, and the head body 51, and on the above-mentioned heat sink 52, and has the electric substrate 55 which supplies the image information incorporated from the electrical connector 551 to the head body 51 side.

[0030] In this example the above-mentioned tank maintenance case 53 As shown in drawing 8, the case members 531 and 532 divided into right and left are joined. In the abbreviation center section of the case member 531,532 The elastic presser-foot piece which holds down the inserted ink tank 40 is prepared. Moreover, the slitting piece 533 in which elastic deformation is possible is formed in the center of the upper part of the case member 531,532, and in case insertion maintenance of the ink tank 40 is carried out at this slitting piece 533 part, the stop hole 534 which stops the stop projection 412 of the ink tank 40 is formed.

[0031] Moreover, in this example, the above-mentioned ink feed zone material 54 is constituted from a manifold 70 which opens for free passage the ink supply pipe 60 by which insertion connection is made, this ink supply pipe 60, and the head body 51 by the tank opening 42 of the ink tank 40. As especially the above-mentioned ink supply pipe 60 is shown in drawing 10 and drawing 11, the cylinder tube part 61, The flange 62 which protrudes on the base side of this cylinder tube part 61 radially, The O ring stop slot 63 where it is formed in the root section with the cylinder tube part 61 of this flange 62, and O ring 68 is stopped, It consists of a sharp height 64 which protruded by the four-place equiangular distance, and a rib 65 which is connected with this height 64 and prolonged along with the peripheral face of the cylinder tube part 61 at the head of the cylinder tube part 61. Especially, in this example, the above-mentioned height 64 has dip edge 64a which goes to the method of outside from the inner skin location of the cylinder tube part 61, and arranges that sharp edge 64b in the peripheral face location of the cylinder tube part 61, and the above-mentioned rib 65 has become the crest type configuration which height increases gradually toward the base side of the cylinder tube part 61. Furthermore, in this example, the head side of the above-mentioned ink supply pipe 60 is equipped with the dust

clearance filter 66 which consists of a SUS mesh. This dust clearance filter 66 is pressed fit and attached in receptacle slot 61a which is the thing of for example, 0.9mm thickness, and was formed in the head inner circumference edge of the cylinder tube part 61, and, as for the apical surface of this dust clearance filter 66, projection arrangement only of the k (this example 0.4mm) is slightly carried out from the head general surface of the cylinder tube part 61.

[0032] On the other hand, a manifold 70 is what was really fabricated with polyetherimide resin. While having the connection section 71 by which insertion connection of the base of the ink supply pipe 60 is carried out through O ring 67 and forming the ink supply line 72 of a thin path dimension from this connection section 71 The long picture liquid room 73 which extends along the die-length direction of the head body 51 is formed at the head of this ink supply line 72, and the slit opening 74 is established to the field facing the pars basilaris ossis occipitalis of this liquid room 73. In addition, a sign 75 is a positioning boss for carrying out positioning immobilization of the manifold 70 at a heat sink 52. Moreover, in this example, as especially the above-mentioned liquid room 73 is shown in drawing 12 and drawing 14, it has the wall surface 731 (receiving horizontally include angle  $\alpha$ : this example 25 degrees - 45 degrees) of a skirt breadth configuration gradually toward the lower part side from the free passage section location with the ink supply line 72, and fills up with the ink I which entered in the liquid room 73 from the ink supply line 72 in the liquid room 73 promptly.

[0033] moreover, in this example, as show especially in drawing 12 and drawing 13, the head body 51 be constitute from a heating element substrate 513 by which opposite arrangement be carry out by the slot substrate 511 which have the slot (channel) 512 of the shape of two or more cross section triangle, and this slot substrate 511, and arrange many nozzles 526 of the shape of a cross section triangle which be open for free passage in the common ink room 525 in pixel consistency. The above-mentioned slot substrate 511 is manufactured by the anisotropic etching of Si wafer. On the other hand, to the heating element substrate 513 On the Si wafer 514, the accumulation layer 515 of SiO<sub>2</sub>, The first protective layer 518 which consists of SiN<sub>x</sub> which covers the exoergic resistor 516 which consists of polycrystalline silicon, the energization electrode 517 which consists of aluminum-Cu, the exoergic resistor 516, and the energization electrode 517, the second protective layer 519 which consists of Ta by which a laminating is carried out on this first protective layer 518, The pit layer 520 which becomes a part corresponding to the exoergic resistor 516 from the photosensitive polyimide which has the pit opening (generation dissipation of a bubble is shut up and ink injection is stabilized) 521 is formed, respectively. In addition, a sign 522 is a bonding wire which connects electrically the electric substrate 55 and the energization electrode 517 of the head body 51 among drawing 12.

[0034] Moreover, in this example, two or more free passage holes 523 are established by the slot substrate 511 of the head body 51 corresponding to the slit opening 74 of the above-mentioned manifold 70, and the ink I from the liquid room 73 of a manifold 70 is supplied to the common ink room 525 of the head body 51 at homogeneity.

[0035] Next, exchange of the ink tank to the ink jet cartridge concerning this example is explained. As shown in drawing 15 at the time of ink tank 40 exchange, the ink tank 40 is picked out from a package and it inserts in the tank maintenance case 53 of the ink jet head 50 as it is. Although the height 61 of the ink supply pipe 60 attaches to the heat welding nature film 44 which has plugged up the tank opening 42 of the ink tank 40 at this time as shown in drawing 16 If the above-mentioned height 61 begins to fracture the heat welding nature film 44 and the above-mentioned ink supply pipe 60 is inserted in the tank opening 42 The rib 65 formed in the periphery section of the ink supply pipe 60 pushes away positively the fracture section of the

heat welding nature film 44 around, and the situation which the fracture section of the heat welding nature film 44 is torn to pieces, and plugs up opening of the ink supply pipe 60 is avoided. In this condition, insertion association is carried out at the tank opening 42, and projection arrangement of the above-mentioned ink supply pipe 60 is carried out as the head general surface of the cylinder tube part 61 of the ink supply pipe 60 is slighter than the tubed part 45 of the ink tank 40 (this example about  $m(\text{refer to drawing 17}) = 4\text{mm}$ ). Then, as shown especially in drawing 17, while the height 64 of the ink supply pipe 60 is absorbed in the ink absorber 41 and mechanical association with the ink supply pipe 60 and the ink absorber 41 is achieved, the front face of the dust clearance filter 66 pressed fit at the head of the cylinder tube part 61 carries out a pressure welding to the ink absorber 41, and fluid-association with the ink supply pipe 60 and the ink absorber 41 is achieved. Then, if the nozzle 526 side of the head body 51 is compulsorily made into a negative pressure condition with the negative pressure generator besides the graphic display in the body side of a printer and you make it filled up with ink from the ink absorber 41 to the common ink room 525 of the head body 51, the preparation to discharging of ink will be completed. Therefore, if discharging of ink is performed by the ink jet head 50 side, the common ink room 525 by the side of the head body 51 will be in a negative pressure condition, and the common ink room 525 of the head body 51 will be supplied in connection with this through the ink feed zone material 54 which Ink I becomes from the ink supply pipe 60 and a manifold 70 by capillarity from the ink absorber 41 of the ink tank 40. [0036] Moreover, in case O ring 68 is stopped by the O ring stop slot 63 of the ink supply pipe 60 and insertion association of the ink supply pipe 60 is carried out at the tank opening 42, adhesion arrangement of above-mentioned O ring 68 is carried out between the flange 62 of the ink supply pipe 60, and the hollow 46 of the ink tank 40, and the leakage of the ink I out of the ink tank 40 is prevented.

[0037] Moreover, although the ink tank 40 will be taken out and inserted in this example as shown in drawing 18 when redoing the wearing condition of the ink tank 40 again Since the tubed part 45 is maintaining at the condition of having compressed the ink absorber 41 even if it extracted the ink tank 40 Even if the ink absorber 41 does not develop extremely and it inserts the ink tank 40 in the tank opening 42 again, the ink absorber 41 does not compress extremely. Therefore, since the ink absorber 41 does not expand and contract greatly even if it takes out and inserts the ink tank 40, there is almost no generating of the air bubbles accompanying telescopic motion of the circumference of ink absorber 41 part, and there is almost no concern which air bubbles mix to the head body 51 side through the ink feed zone material 54.

[0038] furthermore, it oozing from the inside of the ink tank 40, and again, although the ink I to which it comes out and comes will adhere to the O ring 68 pressure-welding section when once removing the time of ink tank 40 exchange, and the ink tank 40 Since the O ring 68 pressure-welding section concerned is the hollow 46 of the tank opening 42 periphery section of the ink tank 40, even if an ink attachment site becomes the narrow part which became depressed from the general outside surface of the ink tank 40 and an operator's hand and other things touch, ink cannot adhere easily.

[0039]

[Effect of the Invention] it has explained above -- as -- claims 1-5 -- according to invention given in either If an ink tank is moreover only inserted in the tank attaching part of an ink jet head end, without removing a tape or a lid, without using a needlelike supply pipe in case an ink tank is exchanged Exchange of an ink tank can be performed very easily, securing the safety of an ink



tank exchange activity, and preventing the dirt in ink effectively, since it enabled it to connect automatically in the condition in which ink supply is possible.

[0040] Moreover, since the configuration which an ink absorber does not expand and contract by extraction and insertion of an ink tank was adopted according to invention according to claim 6 Even if it takes out and inserts an ink tank, generating of the air bubbles accompanying telescopic motion of an ink absorber is avoidable. The air bubbles mixed in the interior of the ink feed zone material to an ink jet head can be pressed down to the minimum, ink discharging of an ink jet head can be stabilized, and image quality can be kept good.

[0041] Furthermore, since ink adopted the configuration which is not exposed to the general peripheral face of an ink tank at the time of ink tank removal according to invention according to claim 7, even if it removes an ink tank, the situation where ink adheres to an operator's hand or a surrounding thing can be prevented effectively.

[0042] Especially, according to invention of claims 8, 9, and 10 and 11 publications, the ink tank or ink jet head which constitutes the ink jet cartridge from which effectiveness which was mentioned above is acquired can be protected effectively.

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## TECHNICAL FIELD

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[Industrial Application] This invention relates to an ink jet recording apparatus, and relates to the ink tank and ink jet head which are used for the ink jet cartridge list with which the body of an ink jet recording apparatus is equipped especially free [ attachment and detachment ] at this.

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## PRIOR ART

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[Description of the Prior Art] If it is in the ink jet recording device in the former, what equipped with the ink jet cartridge which consists of an ink jet head in which an ink tank is attached exchangeable from a viewpoint of raising the supply nature of ink, free [ attachment and detachment ] to the body of an ink jet recording device is already offered.

[0003] Conventionally, as this kind of an ink jet cartridge, while forming a needlelike supply pipe, for example in an ink jet head end, what infixes an elastic seal member in tank opening by the side of an ink tank, thrusts said needlelike supply pipe into this elastic seal member, and was made to make free passage connection of an ink tank and the ink jet head through the supply pipe is offered (refer to JP,3-87266,A). However, if it was in this type, since it was in the condition that it was exposed of the needlelike supply pipe of an ink jet head end at the time of ink tank exchange, there was a possibility that the needlelike supply pipe concerned might touch an operator's hand, and it was not desirable on activity insurance.

[0004] While a tubed ink supply pipe is projected for example, in an ink jet head end as a means to solve such a technical technical problem, make the ink absorber with which ink has sunk in into an ink tank build in, tank opening is made to carry out insertion connection of the ink supply pipe of an ink jet head end, and what was made to carry out pressure-welding arrangement of the ink supply pipe at an ink absorber is already offered (refer to JP,2-187364,A).

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## EFFECT OF THE INVENTION

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[Effect of the Invention] it has explained above -- as -- claims 1-5 -- when only inserting the ink tank in the tank attaching part of an ink jet head end moreover, without removing a tape or a lid, without using a needlelike supply pipe when exchanging an ink tank for either by invention of a publication, it enabled it to connect automatically in the condition in which ink supply is possible. Therefore, exchange of an ink tank can be performed very easily, securing the safety of an ink tank exchange activity, and preventing the dirt in ink effectively.

[0040] Moreover, it is since the configuration which an ink absorber does not expand and contract by extraction and insertion of an ink tank was adopted according to invention according to claim 6, Even if it takes out and inserts an ink tank, generating of the air bubbles accompanying telescopic motion of an ink absorber can be avoided, the air bubbles mixed in the interior of the ink feed zone material to an ink jet head can be pressed down to the minimum, ink discharging of an ink jet head can be stabilized, and image quality can be kept good.

[0041] Furthermore, since ink adopted the configuration which is not exposed to the general peripheral face of an ink tank at the time of ink tank removal according to invention according to claim 7, even if it removes an ink tank, the situation where ink adheres to an operator's hand or a surrounding thing can be prevented effectively.

[0042] Especially, according to invention of claims 8, 9, and 10 and 11 publications, the ink tank or ink jet head which constitutes the ink jet cartridge from which effectiveness which was mentioned above is acquired can be protected effectively.

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## OPERATION

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[Function] In technical means which were mentioned above, if it is in invention which solves the first technical technical problem, at the time of ink tank 1 exchange, the ink tank 1 is picked out from a package, and it inserts in the tank attaching part by the side of the ink jet head 3 as it is. then -- although the ink supply pipe 4 by the side of the ink jet head 3 carries out a pressure welding to the closure member 5 which closes tank opening 1a of the ink tank 1 -- the crushing promotion section 6 of the ink supply pipe 4 -- crushing of the closure member 5 -- promoting -- the ink supply pipe 4 -- breaking through -- the closure member 5 of tank opening 1a crushes, and insertion connection of the ink supply pipe 4 is carried out into tank opening 1a.

[0020] Moreover, if it is in invention which solves the second technical technical problem, in order that the tubed part 7 which projects in the inner direction may be formed in the tank opening 1a inner circumference edge of the ink tank 1 and this tubed part 7 may compress selectively the ink absorber 2 in the ink tank 1, the consistency of the ink absorber 2 of the field facing tank opening 1a is dense especially. Therefore, before equipping the ink jet head 3 with the ink tank 1, it is maintained at the condition that Ink I focused from from by capillarity to the tank opening 1a circumference. So, even if it takes out and inserts the ink tank 1 to the ink jet head 3 in the condition that Ink I has fully sunk in, to the ink absorber 2, from the first, the amount of telescopic motion of the ink absorber 2 based on the existence of contact of the ink supply pipe 2 has very little ink absorber 2 on the relation which is carrying out the compression set by the tubed part 7, and generating of the air bubbles accompanying telescopic motion of the part and the ink absorber 2 decreases.

[0021] Furthermore, if it is in invention which solves the third technical technical problem, a hollow 8 is established in the periphery edge of tank opening 1a of the ink tank 1, and the elastic seal member 9 carries out a pressure welding to this hollow 8 part. therefore, in the time of ink tank removal etc., although Ink I will remain in the elastic seal member 9 pressure-welding section when Ink I oozes from the ink tank 1 side, the ink I concerned adheres to the pars basilaris ossis occipitalis of a hollow 8 -- \*\*\*\* -- it does not pass and does not adhere to the general outside-surface part of the ink tank 1

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## EXAMPLE

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[Example] Hereafter, this invention is explained to a detail based on the example shown in an accompanying drawing. Drawing 2 shows one example of the ink-jet color printer using the ink jet cartridge to which this invention was applied. While a sign 20 is a body of a printer and the form 25 in the form tray 21 is conveyed to the form receptacle 23 through the form conveyance roll 22 in this drawing The ink jet cartridge 30 (specifically 30a-30d) of each color component for which the ink (this example cyanogen, a Magenta, Hierro, black) of each color component is used is attached free [ attachment and detachment ] in the body 20 of a printer. The migration scan of the ink jet cartridge 30 which corresponds based on the image information of each color component sent in from the interface cable 24 is carried out, and the ink image of each color component is written in on the conveyed form 25. In addition, the closing motion lid for ink jet cartridge 30 exchange in the sign 26 in drawing, the manual bypass tray to which 27 supplies a form 25 by manual bypass, and 28 are the console panels for carrying out print directions.

[0023] In this example, as shown in drawing 3 and drawing 4 , the ink jet cartridge 30 of each color component consists of ink jet heads 50 with which it is equipped free [ the ink tank 40 by which it fills up with ink and attachment and detachment of this ink tank 40 ], and it is equipped with it free [ attachment and detachment ] on the carriage 31 for a scan. In this example, the carriage 31 for a scan carries out sliding advice support of the both sides of the cross direction which intersects perpendicularly with a main scanning direction by the guide rods 32 and 33 of a couple, has four hold crevices 34 where hold maintenance of each ink jet cartridge 30 is carried out, and forms the positioning walls 35 and 36 with which the crosswise location of the held ink jet cartridge 30 is restrained in the crosswise both sides of each hold crevice 34. And this carriage 31 for a scan carries out a migration scan suitably along a main scanning direction according to the print directions from a console panel 28, and carries out the regurgitation of the ink droplet according to image information from the ink jet head 50. In addition, the sensor for a sign 37 detecting carriage 31 location under scan, and performing feedback control and 38 are the timing belts for driving carriage 31 among drawing 4 .

[0024] Moreover, the detail of the ink tank 40 used in this example is shown in drawing 5 - drawing 7 . In this drawing, the ink tank 40 is the thing of an abbreviation hollow rectangular parallelepiped configuration, it consists of a box body 401 in which one side face carried out opening, and a side lid 402 which blockades one side face of this box body 401, and die forming of each of each element is carried out with the raw material of ink-proof nature, for example, polyester resin. And in the above-mentioned ink tank 40, the ink absorber 41 of the longitudinal-section 5 angle configuration corresponding to the longitudinal-section configuration of the ink tank 40 is built in, and the ink absorber 41 in this example consists of felt, and fully carries out

impregnation of the predetermined color ink (when the volume of the ink absorber 41 is 43 cc in this example, ink capacity is about 35-37 cc).

[0025] Moreover, the circular tank opening 42 is established by the bottom wall 404 of the above-mentioned ink tank 40, on the other hand, the swelling section 406 is formed in the end side of the upper wall 405 of the ink tank 40, it reaches [ it is open for free passage, ] to an extreme in the ink tank 40, in the center of this swelling section 406, and the atmospheric pressure free passage opening 43 of a minor diameter is established. In addition, the closure tape on which a sign 407 closes the atmospheric pressure free passage opening 43 at the time of ink tank 40 un-using it, and a sign 408 are the tank grasping sections formed in the upper wall 405 of the ink tank 40.

[0026] Furthermore, the above-mentioned tank opening 42 is closed with the heat welding nature film 44 of the shape of a rectangle which consists of a raw material of non-ink permeability. In this example, the above-mentioned heat welding nature film 44 is a thing with a thickness of about 70-120 micrometers it is thin from the charge of a multilayer-structure laminate material of aluminum foil and polyethylene, and is pasted up on tank opening 42 peripheral face in heat welding.

[0027] Furthermore, in this example, the tubed part 45 is formed in the inner circumference edge of the above-mentioned tank opening 42, and as shown in drawing 7 , a projection, its peripheral face, and inner skin have extended especially this tubed part 45 in the breadth configuration at last toward the bottom wall 404 of the ink tank 40 again toward a way about 4mm among the ink tanks 40. And the hollow 46 which becomes depressed in a way side among the ink tanks 40 is formed in the periphery edge of the above-mentioned tank opening 42 again.

[0028] Moreover, in this example, number formation of the minute projection 410 which eats into the ink absorber 41 is carried out suitably at the both-sides wall inner surface of the above-mentioned ink tank 40, and this prevents gap of the vertical direction of the ink absorber 41. Moreover, opposite arrangement of two or more ribs 411 is carried out in the condition of having estranged mutually in the upper part of the both-sides wall inner surface of the above-mentioned ink tank 40, the top face of the ink absorber 41 in the ink tank 40 contacts the soffit side of each rib 411, and the atmospheric air from the atmospheric pressure free passage opening 43 acts on the top face of the ink absorber 41 at homogeneity. In addition, a sign 412 is a stop projection which engages and releases the stop hole 534 of the tank maintenance case 53, in case an insertion stop is carried out at the tank maintenance case 53 of the ink jet head 50 which it is formed in the side-attachment-wall outside surface of the ink tank 40, and is mentioned later.

[0029] Moreover, the detail of the ink jet head 50 used in this example is shown in drawing 8 - drawing 14 . In drawing 8 and drawing 9 the ink jet head 50 The head body 51 with which the supplied ink is breathed out according to image information, with the heat sink 52 which emits the heat produced from this head body 51, and the tank maintenance case 53 held for the mounting \*\*\*\* ink tank 40 to this heat sink 52, enabling free attachment and detachment It was prepared the ink feed zone material 54 which opens for free passage the ink tank 40 held at this tank maintenance case 53, and the head body 51, and on the above-mentioned heat sink 52, and has the electric substrate 55 which supplies the image information incorporated from the electrical connector 551 to the head body 51 side.

[0030] In this example the above-mentioned tank maintenance case 53 As shown in drawing 8 , the case members 531 and 532 divided into right and left are joined. In the abbreviation center section of the case member 531,532 The elastic presser-foot piece which holds down the inserted ink tank 40 is prepared. Moreover, the slitting piece 533 in which elastic deformation is possible

is formed in the center of the upper part of the case member 531,532, and in case insertion maintenance of the ink tank 40 is carried out at this slitting piece 533 part, the stop hole 534 which stops the stop projection 412 of the ink tank 40 is formed.

[0031] Moreover, in this example, the above-mentioned ink feed zone material 54 is constituted from a manifold 70 which opens for free passage the ink supply pipe 60 by which insertion connection is made, this ink supply pipe 60, and the head body 51 by the tank opening 42 of the ink tank 40. As especially the above-mentioned ink supply pipe 60 is shown in drawing 10 and drawing 11, the cylinder tube part 61, The flange 62 which protrudes on the base side of this cylinder tube part 61 radially, The O ring stop slot 63 where it is formed in the root section with the cylinder tube part 61 of this flange 62, and O ring 68 is stopped, It consists of a sharp height 64 which protruded by the four-place equiangular distance, and a rib 65 which is connected with this height 64 and prolonged along with the peripheral face of the cylinder tube part 61 at the head of the cylinder tube part 61. Especially, in this example, the above-mentioned height 64 has dip edge 64a which goes to the method of outside from the inner skin location of the cylinder tube part 61, and arranges that sharp edge 64b in the peripheral face location of the cylinder tube part 61, and the above-mentioned rib 65 has become the crest type configuration which height increases gradually toward the base side of the cylinder tube part 61. Furthermore, in this example, the head side of the above-mentioned ink supply pipe 60 is equipped with the dust clearance filter 66 which consists of a SUS mesh. This dust clearance filter 66 is pressed fit and attached in receptacle slot 61a which is the thing of for example, 0.9mm thickness, and was formed in the head inner circumference edge of the cylinder tube part 61, and, as for the apical surface of this dust clearance filter 66, projection arrangement only of the k (this example 0.4mm) is slightly carried out from the head general surface of the cylinder tube part 61.

[0032] On the other hand, a manifold 70 is what was really fabricated with polyetherimide resin. While having the connection section 71 by which insertion connection of the base of the ink supply pipe 60 is carried out through O ring 67 and forming the ink supply line 72 of a thin path dimension from this connection section 71 The long picture liquid room 73 which extends along the die-length direction of the head body 51 is formed at the head of this ink supply line 72, and the slit opening 74 is established to the field facing the pars basilaris ossis occipitalis of this liquid room 73. In addition, a sign 75 is a positioning boss for carrying out positioning immobilization of the manifold 70 at a heat sink 52. Moreover, in this example, as especially the above-mentioned liquid room 73 is shown in drawing 12 and drawing 14, it has the wall surface 731 (receiving horizontally include angle  $\alpha$ : this example 25 degrees - 45 degrees) of a skirt breadth configuration gradually toward the lower part side from the free passage section location with the ink supply line 72, and fills up with the ink I which entered in the liquid room 73 from the ink supply line 72 in the liquid room 73 promptly.

[0033] moreover, in this example, as show especially in drawing 12 and drawing 13, the head body 51 be constitute from a heating element substrate 513 by which opposite arrangement be carry out by the slot substrate 511 which have the slot ( channel ) 512 of the shape of two or more cross section triangle, and this slot substrate 511, and arrange many nozzles 526 of the shape of a cross section triangle which be open for free passage in the common ink room 525 in pixel consistency. The above-mentioned slot substrate 511 is manufactured by the anisotropic etching of Si wafer. On the other hand, to the heating element substrate 513 On the Si wafer 514, the accumulation layer 515 of SiO<sub>2</sub>, The first protective layer 518 which consists of SiN<sub>x</sub> which covers the exoergic resistor 516 which consists of polycrystalline silicon, the energization electrode 517 which consists of aluminum-Cu, the exoergic resistor 516, and the energization

electrode 517, the second protective layer 519 which consists of Ta by which a laminating is carried out on this first protective layer 518, The pit layer 520 which becomes a part corresponding to the exoergic resistor 516 from the photosensitive polyimide which has the pit opening (generation dissipation of a bubble is shut up and ink injection is stabilized) 521 is formed, respectively. In addition, a sign 522 is a bonding wire which connects electrically the electric substrate 55 and the energization electrode 517 of the head body 51 among drawing 12 . [0034] Moreover, in this example, two or more free passage holes 523 are established by the slot substrate 511 of the head body 51 corresponding to the slit opening 74 of the above-mentioned manifold 70, and the ink I from the liquid room 73 of a manifold 70 is supplied to the common ink room 525 of the head body 51 at homogeneity.

[0035] Next, exchange of the ink tank to the ink jet cartridge concerning this example is explained. As shown in drawing 15 at the time of ink tank 40 exchange, the ink tank 40 is picked out from a package and it inserts in the tank maintenance case 53 of the ink jet head 50 as it is. Although the height 61 of the ink supply pipe 60 attaches to the heat welding nature film 44 which has plugged up the tank opening 42 of the ink tank 40 at this time as shown in drawing 16 If the above-mentioned height 61 begins to fracture the heat welding nature film 44 and the above-mentioned ink supply pipe 60 is inserted in the tank opening 42 The rib 65 formed in the periphery section of the ink supply pipe 60 pushes away positively the fracture section of the heat welding nature film 44 around, and the situation which the fracture section of the heat welding nature film 44 is torn to pieces, and plugs up opening of the ink supply pipe 60 is avoided. In this condition, insertion association is carried out at the tank opening 42, and projection arrangement of the above-mentioned ink supply pipe 60 is carried out as the head general surface of the cylinder tube part 61 of the ink supply pipe 60 is slighter than the tubed part 45 of the ink tank 40 (this example about  $m(\text{refer to drawing 17}) = 4\text{mm}$ ). Then, as shown especially in drawing 17 , while the height 64 of the ink supply pipe 60 is absorbed in the ink absorber 41 and mechanical association with the ink supply pipe 60 and the ink absorber 41 is achieved, the front face of the dust clearance filter 66 pressed fit at the head of the cylinder tube part 61 carries out a pressure welding to the ink absorber 41, and fluid-association with the ink supply pipe 60 and the ink absorber 41 is achieved. Then, if the nozzle 526 side of the head body 51 is compulsorily made into a negative pressure condition with the negative pressure generator besides the graphic display in the body side of a printer and you make it filled up with ink from the ink absorber 41 to the common ink room 525 of the head body 51, the preparation to discharging of ink will be completed. Therefore, if discharging of ink is performed by the ink jet head 50 side, the common ink room 525 by the side of the head body 51 will be in a negative pressure condition, and the common ink room 525 of the head body 51 will be supplied in connection with this through the ink feed zone material 54 which Ink I becomes from the ink supply pipe 60 and a manifold 70 by capillarity from the ink absorber 41 of the ink tank 40. [0036] Moreover, in case O ring 68 is stopped by the O ring stop slot 63 of the ink supply pipe 60 and insertion association of the ink supply pipe 60 is carried out at the tank opening 42, adhesion arrangement of above-mentioned O ring 68 is carried out between the flange 62 of the ink supply pipe 60, and the hollow 46 of the ink tank 40, and the leakage of the ink I out of the ink tank 40 is prevented.

[0037] Moreover, although the ink tank 40 will be taken out and inserted in this example as shown in drawing 18 when redoing the wearing condition of the ink tank 40 again Since the tubed part 45 is maintaining at the condition of having compressed the ink absorber 41 even if it extracted the ink tank 40 Even if the ink absorber 41 does not develop extremely and it inserts

the ink tank 40 in the tank opening 42 again, the ink absorber 41 does not compress extremely. Therefore, since the ink absorber 41 does not expand and contract greatly even if it takes out and inserts the ink tank 40, there is almost no generating of the air bubbles accompanying telescopic motion of the circumference of ink absorber 41 part, and there is almost no concern which air bubbles mix to the head body 51 side through the ink feed zone material 54.

[0038] furthermore, it oozing from the inside of the ink tank 40, and again, although the ink I to which it comes out and comes will adhere to the O ring 68 pressure-welding section when once removing the time of ink tank 40 exchange, and the ink tank 40 Since the O ring 68 pressure-welding section concerned is the hollow 46 of the tank opening 42 periphery section of the ink tank 40, even if an ink attachment site becomes the narrow part which became depressed from the general outside surface of the ink tank 40 and an operator's hand and other things touch, ink cannot adhere easily.

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## DESCRIPTION OF DRAWINGS

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### [Brief Description of the Drawings]

[Drawing 1] (a) and (b) are the explanatory views of the ink jet cartridge concerning this invention showing the configuration of exception \*\*, respectively.

[Drawing 2] It is the explanatory view showing one example of the color ink jet printer using the ink jet cartridge to which this invention was applied.

[Drawing 3] It is the decomposition perspective view showing the whole ink jet cartridge configuration concerning an example.

[Drawing 4] It is the transverse-plane explanatory view showing the mounting condition.

[Drawing 5] It is the decomposition perspective view showing the detail of the ink tank used in the example.

[Drawing 6] It is the explanatory view showing the pars-basilaris-ossis-occipitalis structure of the ink tank used in the example.

[Drawing 7] It is the cross-section explanatory view showing the tank opening structure of the ink tank used in the example.

[Drawing 8] It is the decomposition perspective view showing the detail of the ink jet head concerning an example.

[Drawing 9] It is the explanatory view showing the relation between the head body of the ink jet head concerning an example, and ink feed zone material.

[Drawing 10] It is the decomposition perspective view showing the detail of the ink feed zone material concerning an example.

[Drawing 11] It is the cross-section explanatory view.

[Drawing 12] the relation between a head body and ink feed zone material is shown -- it is a fracture amplification explanatory view a part.

[Drawing 13] It is the cross-section explanatory view showing the detail of a head body.

[Drawing 14] It is the explanatory view seen from [ which shows the relation between a head body and the liquid room of ink feed zone material ] drawing 12 Nakaya mark XIV.

[Drawing 15] It is the explanatory view showing the condition before ink tank exchange of the ink jet cartridge concerning an example.

[Drawing 16] It is the explanatory view showing the condition after ink tank exchange of the ink jet cartridge concerning an example.

[Drawing 17] It is the XVII section enlarged drawing in drawing 16 .

[Drawing 18] It is the explanatory view showing the condition at the time of ink tank removal.

[Description of Notations]

1 [ -- An ink absorber, 3 / -- An ink jet head, 4 / -- An ink supply pipe, 4a / -- A flange, 5 / -- A closure member, 6 / -- The crushing promotion section, 7 / -- A tubed part, 8 / -- A hollow, 9 / -- Elastic seal member ] -- An ink tank, 1a -- Tank opening, 1b -- Atmospheric-pressure free passage opening, 2